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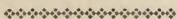
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CONDUCTED BY

H. H. STATHAM,

FELLOW OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.



"EVERY man's proper mansion-house, and home, being the theater of his hospitality, the seat of self-fruit, the comfortablest part of his own life, the noblest of his sonne's inheritance, a-kind of private principedome, nay, to the possessors thereof, an epitome of the whole world, may well deserve, by these attributes, according to the degree of the master, to be decently and delightfully adorned." ♦ ♦ ♦ ♦ ♦

"Architecture can want no commendation, where there are noble men, or noble mindes."—SIR HENRY WOTTON. ♦ ♦ ♦

"OUR English word To BUILD is the Anglo-Saxon Būtan, to confirm, to establish, to make firm and sure and fast, to consolidate, to strengthen; and is applicable to all other things as well as to dwelling-places."—DIVISIONS OF PURLEY.

"ALWAYS be ready to speak your mind, and a base man will avoid you."—WILLIAM BLAKE. ♦ ♦ ♦ ♦ ♦

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Fountains Abbey.*



F all the monastic remains in this, or indeed, any other, land, none can compare with Fountains Abbey in the extent of its buildings, their wonderful preservation, and the ease with which

they may be studied. There is also no other ruin in England which is maintained in such admirable order by its owner, and kept free from ivy and other destructive parasites. Not only are the church with its tower and all the claustral buildings almost intact as they were left when unroofed at the Suppression, but the guest-houses and other buildings in the outer court, which are almost invariably destroyed, here remain; while of the infirmary and other parts of the abbey east of the cloister, the walls are still standing to sufficient height to enable the arrangements and uses of the buildings to be made out. In fact, with the exception of the gatehouse and other outlying buildings,

of which only fragments are left, we have at Fountains the complete plan of a Cistercian abbey of the first rank. Besides this, both the church and monastic buildings illustrate, in a most interesting way the gradual changes that were made after the twelfth century in the arrangements, changes for the most part, except of course in the church, necessitated by the utter impossibility of maintaining in our climate the original rigorous observance of the Rules of the Order, and consequently in the direction of greater comfort.

The story of the foundation of the abbey, of the hardships and desperate struggle for existence of the first convent, and of the sudden change in their circumstances which enabled the monks to begin the buildings, are so well known that further reference to them is not necessary.

The site bestowed upon the first brethren by Archbishop Thurstan, in 1132, was mostly a narrow alluvial flat in the valley formed by the little river Skell, which is here shut in on one side by a steep cliff, that afterwards served as a convenient quarry, and on the other by a high bank rising from the water's edge. The maximum width taken across the west-end of the church does not exceed 600 ft., and further east it is much less. Exactly in the centre was placed the cloister, with the church on the north side and the monastic buildings on the east, south and west. The inner precinct

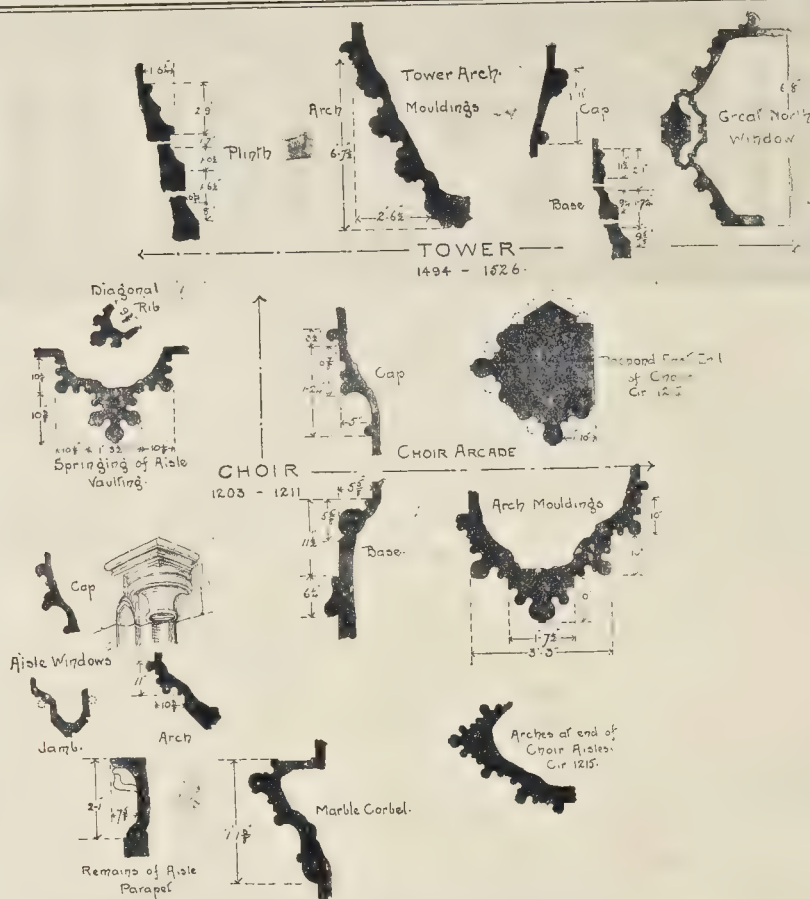
was entered by a gate-house placed about 350 ft. west of the church.

Although the original arrangement has been modified, there is ample evidence that the first buildings were laid out on the normal Cistercian plan, of which Kirkstall, a daughter house of Fountains, probably affords the most complete example in this country. From certain peculiarities in the oldest parts of the church, notably in the gables of the transept chapels and the manner of vaulting the aisles, it is not unlikely that the buildings were begun under the direction of Geoffrey, a monk of Clairvaux, who came to Fountains with the brethren, after their visit to St. Bernard, to teach them the Cistercian rule.

The first buildings at Fountains were mere huts, as was usual, but the advent of the Dean of York, and shortly afterwards of two of the canons, enabled permanent structures in stone to be begun, probably in 1135. Although subsequent alterations have done much to obliterate the first buildings, considerable portions of them exist, and it is curious to find that they were planned on the same large scale that characterises the present remains.

Of the first church the transepts and parts of the nave are yet standing, and the plan and extent of the presbytery may be traced. Portions of the eastern range are also left, as well as of the buildings on the east of it. The southern buildings have nearly all been

* The series of the "Abbeys of Great Britain" is continued this month with illustrations of "Fountains." Particulars of this and of the three Cathedral series ("England and Wales," "Scotland," and "Ireland") will be found on p. xxv.; also (on page i.) of the recent re-issue, in book form, of the series of English and Welsh Cathedrals.



Mouldings and Details from Fountains Abbey. Sketched by Mr. J. A. Reeve.

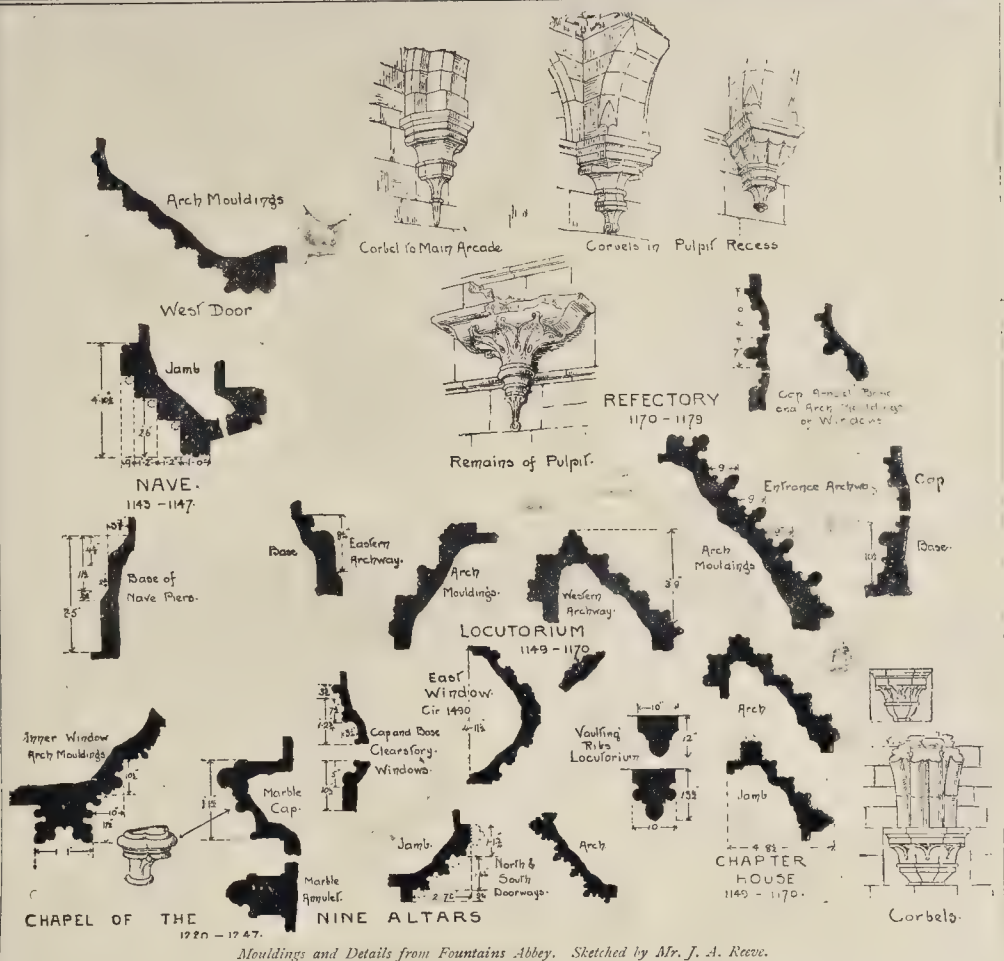
rebuilt, but part of the kitchen remains, as well as the whole of the west side of the cloister, which was from the first of the same size as now. The two-storied garderobe at the south end of the western range is also one of the first buildings.

In 1146 or 1147, out of revenge for the part taken by Abbot Murdac in the deposition of William, Archbishop of York, armed adherents of the latter came to Fountains, broke open the doors, and invaded the church and buildings in search of the abbot. Not finding him, they set fire to the abbey, which was reduced to ashes. The church does not seem to have been much injured, but the claustral buildings were so ruined that they all had to be rebuilt. The portions first reconstructed were the eastern range, including a new chapter-house and the monks' dormitory above, and the northern half of the western range for the housing of the *conversi* or working brothers. The two guest-houses in the outer court and the infirmary for the *conversi* seem also to have been built just after the fire, perhaps to replace burnt wooden buildings that had hitherto served the purpose. The frater, with a new kitchen and the warming-house, and the southern half of the western range were probably rebuilt by Abbot Robert, 1170-1179. Of the same abbot it is recorded that *instauravit ecclesiam fabricam*. This may refer to the completion of the nave, which was evidently built in sections. After Abbot Robert's death, no further mention of

the buildings occurs until the abbacy of John of York, 1203-1211, during whose rule the number of monks so increased that there were not enough altars for them to celebrate mass at, and the choir was not large enough to hold them. The abbot accordingly began to enlarge the church eastwards, but he had only laid the foundations and set up some of the pillars when he died, and the work was carried on by his successor, John the second, 1211-1219. The extension was finally completed by Abbot John of Kent, 1220-1247, who further built a new cloister and the infirmary, as well as the guest-house for poor folk in the outer court. He also added to the infirmary the northern and eastern sections of the corridor or gallery which connects it with the church and cloister. After John of Kent's death no further works are recorded. During the Decorated period the infirmary chapel and kitchen were rebuilt, and the western section of the gallery leading to the cloister constructed, probably in place of something earlier made of wood. Towards the close of the fifteenth century large Perpendicular windows were inserted in the east and west fronts of the church and at the ends of the Nine Altars by Abbot John Darnton, 1479-1494, who also seems to have replaced the stone vaults of the presbytery and Nine Altars by open wooden roofs, and to have lowered the other high-pitched roofs to correspond with his new ones. The last important alterations

were made by Abbot Marmaduke Huby, 1494-1526. To him is due the stately steeple, which was built at the end of the north transept, after, apparently, an ineffectual attempt to prop up the old central tower. Huby also rebuilt and enlarged the abbot's lodging, which stood midway between the cloister and the infirmary, and added an upper gallery over the passage leading to the Nine Altars, with a pew or closet at the church end, wherein he could hear mass said at one of the altars below. He also erected a large two-storied building against the west wall of this gallery, and made sundry important alterations on the west side of the infirmary. Besides building a new tower, Huby walled off the transept chapels next to it, to give additional support, and removed the northernmost altar into the transept. He also seems to have rearranged the western half of the church, and to have built a large additional vestry or sacristy office against the south wall of the presbytery. Most of Huby's works may be identified with certainty by a creamy-white limestone, which he alone used in the buildings at Fountains.

Of the later history of the abbey it is only necessary to say that it was suppressed in 1539, but beyond the unroofing of the buildings nothing of any importance seems to have been destroyed. The infirmary, the abbot's lodging, and the gate-house, with some of the outer buildings, are practically all that have been partly pulled down, and of these much is left. Whatever else has



Mouldings and Details from Fountains Abbey. Sketched by Mr. J. A. Reece.

gone has probably disappeared through the ravages of time.

The abbey has been singularly fortunate in its subsequent possessors, though Mr. Aislabie, who owned it in the last century, cleared the church from end to end to make a vista, and destroyed the remains of the cloister to form a garden. His eldest daughter, Mrs. Allanson, to whom the abbey descended, began in 1790 to clear the chapter house of rubbish. The next owner, Mrs. Lawrence, between 1808 and 1845, judiciously repaired the tower, the nave-aisles, and the vault of the great western range. The ruins were finally brought to their present excellent condition by the late Earl de Grey and Ripon, who carried out extensive excavations between 1848 and 1856, and laid bare the remains of the infirmary and abbot's lodging. Some minor works, which had been left undone, were completed by Mr. St. John Hope, by permission of the present owner, the Marquis of Ripon, in 1887-8.

From the brief sketch which we have given of the documentary history, it is time to turn to an examination of the abbey itself. Of its site and the disposition of the main buildings we have already spoken.

The church was originally about 270 ft. long, and consisted of an aisleless presbytery of three bays, north and south transepts, each with three eastern chapels, and a nave and aisles of eleven bays. The west end of

the nave was covered by the wide porch peculiar to the Cistercians and Cluniacs. The nave arcades are of the plainest possible character, with simple pointed arches, and cushion capitals to the tall round columns. There is no triforium, and the clearstory windows, plain round-headed openings, with no wall-passage, rest upon a string-course, separated from the tops of the arches by six or seven courses of ashlar. The nave was not vaulted, and probably had a flat wooden ceiling. The aisles were vaulted throughout in stone, but in a very peculiar fashion. The bays are divided by plain, round arches, springing from scolloped corbels built into the piers, about 4 ft. below the capitals, and into the aisle-walls. Upon these rested a series of pointed vaults without ribs, set transversely across the aisle. All these have now fallen, but the cross arches remain throughout. The transepts are plain to a degree. On the east sides are pointed arches opening into the chapels, with round-headed windows in the opposite wall, and above, a clearstory stage corresponding with that of the nave. The south transept gable has two large windows in the uppermost stage. Of the presbytery nothing is left but the foundations underground; its extent is shown on the plan, as is the unusual arrangement of the chapels that adjoined it. The chapels themselves had pointed rubble vaults, and were lighted by two round-headed windows in the

east wall, with a circular opening above, surmounted by curious-pointed gables. This arrangement is probably due to the foreign influence of Geoffrey of Clairvaux.

The Early English extension of the church consisted of a new presbytery with aisles, of five bays, with a transverse eastern chapel or transept, 129 ft. long, called the Nine Altars. There can be little doubt that although he only lived to lay the foundations and to set up some of the pillars, the whole of this extension was planned by Abbot John of York, for the enlargement of the choir and the increase in the number of altars. The presbytery arcades have unfortunately gone, but three of the responds remain, and the aisle walls are standing to their full height. From certain differences in these it is clear that the work of John of York and his successor was confined almost entirely to the new presbytery, and that the fully-developed Early English work of the Nine Altars is entirely due to Abbot John of Kent. Despite later alterations and mutilations, enough remains of the original design to fill us with admiration of the skill of the architect of this beautiful work, which evidently suggested the great chapel with the same name in the corresponding position at Durham.

Of the stately tower added by Abbot Huby, it is only necessary to say that it is a very fine example of a well-known Yorkshire type, the late date of which is marked by the absence of cusping in the window

tracery. With the exception of its pinnacles, the Fountains tower is still practically intact from top to bottom, but its floors and roofs have of course been removed. It opens into the transept by a lofty arch, which exhibits a curious attempt on the part of its builder to reproduce, though not very successfully, the mouldings of an earlier style.

Space will not permit of more than a passing notice of the arrangements of the church, but it is evident from the marks on the walls and pillars, and the remains of altars, that the original division of the church between the monks and *conversi* had been given up before the Suppression, and the party-walls between the arcades removed. The choir of the *conversi* in the nave had been cleared away, and in the floor where they once stood Abbot Huby laid down the two rows of procession-stones which are shown (though not quite correctly) on the plan. The screen or loft at the entrance of the monk's choir filled up (as at Norwich) an entire bay, the second from the crossing, and had another screen, with the nave altar against it, a bay west of it. The stalls extended as far as the eastern arch of the crossing. In the vicinity of the nave altar the aisles were cut up by screens into a series of chapels. The high altar is supposed to have stood at the east end of the presbytery, where a platform formed of portions of John of Kent's *pavimentum* was made or restored by Mr. Aislaby. There are no signs or remains of the altar itself.

Of the arcaded wall enclosing the cloister garth, built by Abbot John of Kent, nothing is now left, nor is there anything to show that his work remained until the Suppression. Some interesting fragments preserved in the abbey museum enable us to see that it was of a usual type, an open arcade carried by twin shafts, and supporting a wooden pentise roof.

Of the buildings round the cloister so much is left that it is impossible in our limited space to do more than point out their uses and chief architectural features. Commencing with the east side we have, next the transept, a narrow vaulted space, originally the book-closet and vestry, but afterwards converted into a passage, and finally into a bonehole. Next comes the chapter house, which was a fine apartment, rebuilt on a larger scale after the fire, and divided into three alleys by two rows of columns to carry the vault. It was 83 ft. long, and of six bays, but the two westernmost formed a vestibule, and were not so lofty as the rest on account of the dormitory above. Only the side walls now remain, but round them is the stone bench on which the monks sat in chapter, and on the floor are the grave-slabs of many of the abbots. South of the chapter house and contemporary with it is a small chamber, covered by a good ribbed vault, and with a door at either end. This was the parlour, in which the monks might talk instead of in the cloister, where conversation of any kind was strictly forbidden. The rest of the range is occupied by a building of the first period, seven bays long, with later alterations and insertions. Through the north end of it was the passage from the cloister to the infirmary; the remainder was a mere cellar. Over all these chambers from the transept southwards was the great dormitory of the monks. It was reached by an existing stair ascending southwards from the south-east corner of the cloister, but almost all the walls have fallen, except those of the extension over the eastern part of the chapter house and the east wall of the southern half. The latter shows, in a most interesting way, how the old wall was raised after the fire, and new windows cut through it. At the north end of the dormitory was a lobby, with a door in the transept wall, through which the monks passed on to a flight of steps descending into the church when they rose at midnight to say matins and lauds. East of the lobby was the treasury. At the south end of the dormitory, and extending eastward from it, was a building two stories high and about 90 ft. long.

Its upper floor was entered from the dormitory, and formed a wide lobby with a row of wardrobes along the south side, built over a running stream supplied by the river. Beneath the lobby, on the ground-floor, was probably the novices' department. Extending northwards, at right-angles from the east end of this building, was the abbot's *camera* or lodging, in the basement of which was the prison. The abbot's lodging was almost entirely rebuilt by Abbot Huby, who absorbed into it the eastern part of the garderobe building, and made there a chamber with oriel windows on the east and south. All here is, however, so ruined that we have little more than the plan to guide us. To the east of the abbot's lodging are the greatly-ruined remains of the monks' infirmary. It was first built by Abbot John of Kent (1220-1247), and connected with the cloister and church by the galleries or passages already mentioned. Owing to the contraction of the sides of the valley, and the inability of finding a site for the infirmary without encroaching on the cemetery, Abbot John with extraordinary skill made a place for it by building a great platform above the river Skell, with four parallel tunnels, each 10 ft. wide and as high, for the passage of the water. Upon the platform stood the great hall, which was 170 ft. long, and 70 ft. wide, with broad aisles on both sides and at each end of its central nave, which stood north and south. East of this were the chapel, kitchen, and other chambers, and on the west the garderobe and other offices, but these were replaced by the misericorde, or hall for eating flesh, by Abbot Huby. The sick and infirm, and other inmates of the infirmary were at first lodged in the open aisles of the great hall, but these were subsequently cut up into a number of small chambers or living rooms, furnished with fire-places. So little is left of the infirmary buildings beyond the foundations, that it is impossible to speak with certainty as to its architectural features.

The buildings on the south side of the cloister are of later date than those of the eastern range, and are probably the work of Abbot Robert (1170-1179). The principal building is the great "refectory," or frater of the monks, which was a noble hall, 110 ft. long and nearly 50 ft. wide, with a central row of four lofty columns carrying its double gabled roof. These columns are unfortunately ruined to their bases, but the walls are standing all round nearly to their full height. Each gable had a pair of large lancet windows with (originally) a round window above. The sides, where clear of the range, contain six similar windows, but the three northernmost on the west side are shorter than the others, and are set in the back of an arcaded gallery built out to contain the reader's pulpit and the staircase to it. The traces of the arrangements of the frater are unusually perfect, and show that the tables stood upon stone legs placed upon platforms against the side walls, with a stone bench behind upon which the monks sat. The high table stood upon a similar platform, or dais, carried right across the upper end of the hall. The frater is entered from the cloister by an elaborately-moulded round-headed doorway, on either side of which are the arched recesses where the lavatory was formerly placed. Beyond these, again, are two other, but quite plain, doorways, opening into two rooms that adjoin the frater on either side. The easternmost of these is quite perfect, and retains its vault, which springs from a central pillar. The room measures 21½ ft. in width and 40 ft. in length, but its only prominent features are two huge fireplaces (one now blocked up), 16 ft. wide, in the east wall, with ingeniously-joggled lintels. A door on the south opens into a yard. The room west of the frater is 35 ft. square, and has until lately been considered the buttery, for which purpose it is in no way fitted. It was, however, shown by Mr. St. John Hope, at a special meeting of the Yorkshire Archaeological Association at

Fountains in 1888, that this place was really the kitchen, and that two fireplaces stood in the middle, back to back, thus forming, with the passages at each end of them, a central block against which the uneven number of vaulting bays, north and south, abutted. The kitchen had also a turntable in the east wall, through which to pass food into the monks' frater, and another in the west wall opposite opening into the frater of the *conversi*. Mr. Hope further showed that the eastern apartment, which had always been called the kitchen, contained no traces of its use as such, except two large fire-places, and that it was actually the *calefactorium*, or warming-house, where the monks might warm themselves in winter.

Above the warming-house is another room of the same size, but somewhat later in date, also quite perfect, and vaulted from a central pillar. It is now used as the abbey museum, but originally it was probably the munition-room. It is approached by a lobby opening off the dormitory stairs, with doorways provided on the inner side by drawers and other safeguards against intrusion. On the north the room is lighted by two simple triplets of lancets; on the south there is a similar triplet in the lobby, which cuts off a corner of the apartment, and two wide lancets in the other bay overlooking the yard. Above this room again, was another, which was reached by a spiral stair opening out of the lobby. The surviving chimney of the warming-house shows that it had a high-pitched roof, but the walls are destroyed except on the south, where is an archway for hoisting stores through by means of a crane fixed above. There are also some slight remains of a chamber over the kitchen, reached from the building west of it; perhaps a storeplace of some kind.

The wall forming the west side of the cloister belongs to the first buildings, and has been proved by Mr. St. John Hope to have originally been the division between the cloister and a lane west of it, as at Cîteaux, Clairvaux, Kirkstall, and other Cistercian houses. In the rebuilding after the fire this lane was done away with, and upon its site was raised the great range of buildings known collectively as the *cellarium*, because under the charge of the cellarer. This very striking feature of the abbey is no less than 300 ft. long, and of twenty-two bays, and is still quite perfect structurally, with the exception of the roof and divisions of the upper story. The lower story preserves intact its vault, which springs from a central row of pillars and corbels in the side walls, but the division walls have been knocked down to make a vista, and the whole twenty-two bays are now open from end to end. The four doorways in the west wall show that the range was cut up into at least as many sections. The two northernmost bays formed the outer parlour and a porch covering the door here into the nave. The next four bays formed a cellar, with three rounded-headed windows on the west and a wide doorway for bringing in stores. The two next bays had two west windows but no outer door, and were walled off to form the buttery; the entrance would be in the partition wall. The next bay has a door at each end, and with the adjoining bay formed the entry into the cloister from the outer court. The remaining twelve bays formed the frater of the *conversi*, which was served through a hatch or turntable, now destroyed, from the convent kitchen. It has already been stated that the two halves of the *cellarium* are of different dates. This is shown on the ground-floor by the windows, which are round-headed in the northern half, but larger and pointed in the southern. In the upper story the windows are round-headed throughout. This upper floor was used as the dormitory of the *conversi*, and like that of the monks has a garderobe at one end and a staircase down into the church at the other. Access by day was by an external stair on the western side, under which is a small vaulted apartment that served probably as the cellarer's checker or office. From the stair, which was

covered, a pentise extended along the cellarium wall as far as the church.

Standing athwart the west end of the garderobe of the *conversi* are the ruins of a large hall, divided by pillars into a nave and aisles of at least six bays, with the remains, perhaps, of a kitchen on the south-west. It is built over the river on four parallel tunnels, like the monks' infirmary, and as it is of earlier date, probably suggested to John of Kent the idea of his much larger platform. From its close connexion with their part of the abbey this building was most likely an infirmary for the use of the *conversi*.

A few yards to the west of this infirmary stand the interesting ruins of two large two-storied guest-houses. The easternmost is most ruined, especially as regards the upper story, which was gained by an external staircase. The ground floor retains more or less of the five clustered pillars that carried its vault, and the north gable has two two-light transitional-Norman windows, with a blocked wheel window above. The western house, though more ruined than the other, bears signs of greater comfort and convenience. Both houses have undergone alteration, but seem to have had a hall on the ground floor, with a solar above. An additional hall of some size, now ruined to its foundations, was afterwards built against the north side of the western house.

Of the thirteenth-century gatehouse only an insignificant fragment is standing. Outside it there are some remains of the little chapel that usually stood there in a Cistercian abbey. This was of the twelfth century.

Two other structures deserve a passing word: the one, a charming little twelfth-century foot-bridge, crossing the Skell close to the eastern guest-house; the other, a well-built thirteenth-century bridge of two arches, a little higher up-stream, in line with the gatehouse. On the rising ground to which these bridges lead are the ruins of the bake-house, brew-house, and malt-house.

A little to the west of the bridge is a *rara avis* indeed, a thirteenth-century mill, with traces of an older structure coeval with the earliest portions of the abbey, and still in full work!

It is only natural that so important a ruin as Fountains should have been the subject of many essays, historical and architectural. The most important of these until recently were an excellent paper by Mr. Gordon Hills, printed by the British Archaeological Association,* and the two volumes so ably edited by the late Mr. Walbran for the Surtees Society. From the architectural point of view all previous works have now been surpassed by a magnificent folio volume lately published by subscription by Mr. J. Arthur Reeve.† In this monumental work not only is every part of the abbey most thoroughly planned and illustrated, but every single wall-surface is given in elevation, with all the stones, jointing, cracks, and scars carefully drawn to scale! We cannot but admire the patience which produced the drawings, and the accuracy with which every feature is reproduced. The series of drawings is preceded by a brief historical introduction, a catalogue of the abbots and their works, and a careful architectural description of the buildings. The addition of a few plates of mouldings would have satisfied the most exacting student. We are indebted to Mr. Reeve for his kind permission to reproduce, on a necessarily reduced scale, his general plan of the abbey buildings; and he has also supplied us, from among his memoranda, with the sections of mouldings and sketches of some of the architectural details, which accompany this article.

CLOCK, BRILL, BUCKINGHAMSHIRE.—On the 22nd ult., a large chiming clock was started at Brill Church, Buckinghamshire. It is the gift of Mr. J. H. Seargeant, of London, and the work has been carried out by John Smith & Sons, Derby.

* *Collectanea Archaeologica*, ii., 251-302.

† "A Monograph on the Abbey of St. Mary of Fountains." By J. Arthur Reeve, Architect. London: 1892.

NOTES.

THE eight Bills which the London County Council has deposited for the purpose of obtaining command of the water supply of London by purchasing the present companies are, we suppose, to be regarded rather in the nature of measures to test public opinion than as seriously framed with the expectation of their being passed into law during the coming Session. According to these Bills the transfer shall take place on December 31, 1895, but as a new Council has to be elected in March it is hardly likely that the new body will be in a position to take over the companies' work by the end of the year. It is also doubtful whether the new Council will even go so far as to pass their predecessor's Bills through Parliament until they have fully discussed and considered the question. It is indeed somewhat doubtful if it is desirable for a moribund Council to introduce Bills of so great importance into a moribund Parliament. Some of the terms proposed by those Bills are scarcely likely to meet with legislative approval. For example, no compensation is to be given to the companies in respect of compulsory sale; but such compensation has always been regarded by the Legislature as reasonable and fair. It is quite certain, therefore, that the companies will have to be paid this item. Again, no allowance is to be made "in respect of any assumed future increase of the rateable value other than an increase due to alterations or additions involving increased supply of water." In other words, as we understand the Bill, no allowance is to be made for any prospective increase in value, which usually forms one element in the assessment of the present value. If a railway company takes the house of A, which in ten years' time is likely to be worth 1,000*l.* more than it is at present, an arbitrator regards the prospective increase as a reason for adding something to the value of the house in assessing its price. We can see no reason why there should be an exception in this instance to the general rule. It may be a public misfortune that the water-supply of London has not long ago been taken out of the hands of private companies, but, as it is in their hands, it is obvious that they must be treated in the same manner as any other persons whose land or business is taken over by a company or a corporation.

THE last word has not yet been said respecting the curious proceedings at the meeting of Portland cement manufacturers, which was held in the Cannon-street Station Hotel on November 12 last. After reading the report of those proceedings we characterised the statutory declaration—that the signatories had not at any time added any material to their cement-clinker or cement—as both foolish and useless—foolish because it had not been ascertained that every added material was injurious to cement, and useless because the declaration was merely retrospective. We are glad to find that the Cement Section of the London Chamber of Commerce has now taken the matter up, and has, in the words of its secretary, Mr. Kenric B. Murray, "instructed eminent experts, not themselves cement-manufacturers, to make exhaustive inquiries into the extent to which the introduction of Kentish rag and other materials into the manufacture of Portland cement may be found to prevail, and as to their effect on the quality of that article." But, after all, this question of manufacture is not of primary importance to the user of cement. What he requires is a material possessing certain qualities of tenacity, endurance, and economy, and to ascertain these qualities the tensile strength, soundness, and fineness of Portland cement are tested. In a letter which appeared in the *Times* on Saturday last, Mr. Gilbert R. Redgrave draws attention to the laxity and lack of uniformity of English tests; he advocates

(and wisely, we think) the adoption of a standard scale of tests on the lines of those enforced in Germany, although perhaps more stringent in some respects, and also the formation of a strong association of English cement-producers and cement-users bound to enforce those tests. This is certainly an infinitely more rational proceeding than the signing of a declaration as to the ingredients of cement produced in past years. Why should not the gentlemen who were so eager to sign the retrospective declaration at the Cannon-street meeting sign another statutory declaration to the effect that they will not in the future (the past may be left out of consideration) supply any cement which does not comply with certain standard regulations? We should then be assured of their good faith, and architects would doubtless make haste to specify their cement in preference to that manufactured by non-signatories.

MR. T. G. JACKSON wrote this week to the *Times* to suggest that advantage should be taken of the establishing of District Councils for an inquiry into the rules under the "Building Act," and for their revision if necessary. He bases this demand on a failure of the law (as he alleges), in regard to new buildings at Wimbledon. At the end of his letter Mr. Jackson wrongly refers to the Parish Councils as if they were the same as District Councils. The letter, if we may say so, is characterised by some confusion of thought; the Urban District Councils are simply the old Local Boards under a different name, and there is no more reason why this change of nomenclature should make it a fitting time for an inquiry into the state of the law on buildings than into any other of the various matters connected with local government. What Mr. Jackson wishes is an inquiry into the state of the law as to buildings, which is quite distinct from a complaint as to its administration; and he also has a grievance that the Local Board of Wimbledon have allowed a new building to be an infringement of the existing by-laws as to open spaces framed under the Public Health Act, which Mr. Jackson miscalls "the Building Act," under the plea that it is an addition to an old building. Mr. Jackson's letter has elicited a reply from the Clerk to the Wimbledon Local Board which is a still more remarkable exhibition of confusion of argument. "Mr. Jackson," he says, "contends that an addition to an old building is in fact a new building. But anyone connected with local government law knows very well that this is not so." The clerk then proceeds to cite a case to justify this statement, and then proceeds to point out that the question whether a work is a new building or an addition to an old building is "a question not of law, but of fact, to be decided upon all the circumstances of the case." This latter statement correctly lays down the law, but it is opposed to the first observation, which we have already quoted. Without knowing all the circumstances of the case to which Mr. Jackson somewhat vaguely refers, it is impossible to say whether there has been an infringement of the by-laws. He speaks of a local builder "introducing a large building into a confined back-yard, to the danger and annoyance of his neighbours." Whether this is properly an "addition," or a "new building," depends, among other things, on the state of the adjacent buildings. Mr. Jackson winds up his letter by the complaint that if a local authority does not perform its duty "there exists no machinery for making it do right." We fear that the statement will hurt the feelings of lawyers, who are taught that there is no wrong without a remedy. But has Mr. Jackson verified this assertion? The writ of *mandamus* is employed every day to compel authorities to perform their duties, and Section 101 of the Public Health (London) Act, 1891, and Section 299 of the Public Health Act, 1875, expressly state that the performance of a duty by the authorities

may be enforced by *mandamus*, though no such assertion of a fundamental principle of English law is really required.

THE Report of the Council of Almoners for a period extending over the last three years in regard to Christ's Hospital has recently been issued. This Report will no doubt again raise the question as to the suitability of the site purchased at Horsham from the Aylesbury Dairy Company for the purposes of a school. In the Report of Mr. Rogers Field and Dr. Charles Kelly, the Medical Officer of Health for West Sussex, the opponents and friends of the site will find abundant argument. It seems, however, to be too late, looking at the matter from a practical point of view, to reconsider this question of site. The estate has been purchased at a high figure, it is not likely that it could be resold as agricultural land except at a heavy sacrifice. There may be drawbacks to the site, but these do not appear to be such as cannot be overcome by skilful and prudent building and sanitary arrangement. There are many public schools of which the sanitary and health state is satisfactory, which yet, however, are not situated on the most ideal sites—such, for example, are Eton and Harrow. There cannot be a doubt that the Horsham site is high and open. It may be that the Council of Almoners might have made a better choice, but having purchased the estate, probably the best now be made of it.

AT the church of the Ascension, Lavender Hill, an organ by Messrs. Beale & Thynne has been erected in which a new method of decorating organ-pipes has been carried out which is of some interest. It is a process of metal etching, a patent of Mr. Pulling's, for which Messrs. Beale & Thynne are the agents. The design is drawn on the pipe-metal by hand while the metal is still flat, the pattern being placed so as to show in front after the metal has been rolled into pipe form. The metal is then protected on both sides by a temporary coating impervious to acid, except where the interstices of the design occur, and placed in an acid bath, when the result is a design in relief between the spaces bitten out by the acid. Thus a decoration is formed in relief in the metal, which is indestructible and will never require renewing. Colour can also be applied to heighten the effect, if desired. Of course the process could be applied also to produce a design in intaglio in the metal, and of a more delicate kind than the examples which have been submitted to us, which did not strike us as representing the best that could be done. The method certainly presents some new possibilities in the decorative treatment of organ-pipes.

FOR some years the editor of the *Baptist Hand-book*, an annual "published under the direction of the Council of the Baptist Union," has devoted a certain amount of space to the description and illustration of new Baptist chapels. The hand-book for 1895 is no exception, Part VII. being denominated "Architectural." It furnishes somewhat curious reading, and the illustrations give point to Matthew Arnold's reflections on what he termed Hebraism and Hellenism. The chapel at Loughborough Park, Brixton—a building with arched doors and windows, with mullions, transomes and tracery—is said to be "in the Grecian Renaissance style usually adopted by architects when designing this class of building!" We were relieved to find that no architect's name appears in connexion with this building, and it may therefore be presumed that the builders—whose names we will charitably suppress—are responsible both for the design and the description. Their modesty, however, in not claiming the title of architect, is not emulated by the builder of the squat little Silvertown Chapel; this gentleman

concludes his report with the business-like announcement, "Architect and builder, Mr. W. H. Crown Works, —, —." Evidently Mr. W. H. — has an eye to future commissions and profits. Another chapel might, from the printed description, be taken to be of American origin—"the free Romanesque style of architecture" conjures up thoughts of Richardson and his many followers—but the illustration, as before, gives the lie to the description. Of all the buildings mentioned, there is only one really worthy architectural monument, and that is Mr. Hippolyte J. Blanc's "Coats Memorial Church" at Paisley; the other buildings are simply nowhere. This one church has cost about 100,000*l.*, while the remaining *thirty-two* have been built for less than half that amount. The one furnishes accommodation for 1000 persons, at a cost therefore of 100*l.* a sitting, while the twenty-nine chapels, for which statistics both of cost and accommodation are given, provide 12,000 sittings, at a cost of 45,814*l.*, or only 3*l.* 10*s.* 8*d.* a sitting. The cheapening economy revealed in these latter figures is astounding. Baptist buildings are too cheap to be of much architectural merit. There is nothing monumental about them. The money spent in adorning the "front" of a chapel—and building committees seem unable to get beyond this—is, artistically, sheer waste as long as the construction is so flimsy and the "back" so bald and ugly.

A CORRESPONDENT who signs himself "A Duffer," but encloses no name and address (for which reason we do not print his letter), takes exception to the angels in Mr. Hamilton Jackson's design in our issue of December 22, and wants to know something about the construction of winged angels; whether they are born with drapery; whether they ever change it, whether it ever wears out; how the wings are put on, &c. We may point out to our correspondent that we are not responsible for the construction of angels which are not made on the premises, but merely published by us with the artist's name attached. His queries should more properly be addressed to the artist. *du reste*, we quite agree with our correspondent that the delineation of robed angels with wings growing out of their shoulders through the drapery is an absurdity the moment you begin to reason about it, and we have always considered it a very weak treatment. But some allowance must be made for the double difficulties under which a painter labours in depicting an angel. He has, in the first place, to convey the idea of a spiritual being to the eye by means of a corporeal representation. We know but one form of body characteristic of intelligent beings; we can only realise an angelic form in human shape. And it is no doubt to avoid the collision between a spiritual idea and a corporeal realism, that many painters in all ages have taken refuge in the conventionality of a long drapery for angels, leaving the angelic body to the imagination. This is of course a weak evasion of the difficulty; and a much finer and more powerful way of meeting the problem would be to represent the angels as splendid creatures in human form and in naked vigour and grandeur. Michelangelo generally took that course; Blake did in some of his most powerful drawings. But an artist who tries that will find himself in a difficulty of another kind. He will find that the British public will not stand naked angels; they will call them "improper," and pious families will not purchase his designs. What, then, is the unlucky painter to do? Rembrandt gave a hint in his beautiful little picture of "Jacob's Dream," where the angels seem like indistinct but radiant forms gliding down a beam of

moonlight. More might be made of this idea perhaps, and an angel be represented by a benign countenance emerging from a radiant mist. But this, though more idealised than the drapery, does not leave much for the draughtsman, and is wholly inapplicable to sculpture. As to the attachment of the wings, we have always held that where winged angels are represented, the wings should take the place of arms, to allow for anatomical possibilities. But we doubt if the British public will stand that either. It is the British public that is at the bottom of the difficulty.

LETTER FROM PARIS.

THE great artistic event of the last month, the collection of designs for the 1900 Exhibition, has been already fully treated of in the *Builder*. The attention of the Parisian public has been concentrated on this exhibition; but some notice is due to another exhibition, much more modest, yet very interesting—that of the works of Joseph Chéret, the sculptor, who has been so prematurely taken from us, which have been collected at the Ecole des Beaux-Arts. Like his brother Jules, whose coloured lithographs decorate the walls of Paris, Joseph Chéret was a designer of the first order, whose compositions betray an originality and a facility of handling truly remarkable. In his terra-cotta bas-reliefs, in his vases and minor decorations of all sorts, he could produce garlands of women's and children's figures, treated with a grace and elegance reminding one of Clodion. From this collection the State has chosen, for the Luxembourg Museum, a very pretty fountain, decorated with a group of children crowning a dolphin.

This exhibition of the sculptures of Chéret, with its grace and its essentially modern feeling, contrasts strangely with the average exhibitions of the Ecole des Beaux-Arts, which exhibit more or less of the severity consequent on official training. Even here, however, it seems that the strict rules of academical tradition are somewhat ignored by the young artists of to-day. This, at least, is what is to be gathered from the report of the last "Envois de Rome," by M. Henri Delaborde, who is very severe on the young students of the Villa Medici. The criticisms of the venerable Academicians appear to us to be unduly bitter, especially in regard to the subjects in painting and sculpture. He reproaches the young artists with neglecting the inspirations to be derived from their surroundings, despising the examples of the old masters, and following those of the fashionable artists of the day; with having, in a word, their eyes rather on Paris than on Rome. Without wishing either to discuss or justify this accusation, we may content ourselves with observing that it is at all events not new, and that the same criticisms were addressed to the "Prix de Rome" men fifty years ago, at the time when Eugène Delacroix figured among the Academicians of his day as a most dangerous and revolutionary person.

It is generally in the month of December that there occurs every year the rearrangement of the Luxembourg Museum occasioned by the necessity of finding place for new works. This year the operation has been postponed in consequence of the various repairs necessary in the very insufficient buildings in which the works of our modern artists are stored. There is talk, it is true, of enlarging the museum by covering in the terrace towards the garden, forming thereby several new galleries for sculpture and for foreign paintings; but this is only a half-measure, and in a few years something further would have to be done. In any case nothing good will ever be made out of the old orangery, and it would be far better to build at once a large museum worthy of the claims of contemporary art. In this matter the State will soon find itself left behind by the Municipality of Paris, which is working hard at the organisation of its two museums, that of the "Pavillon de la Ville" (now enlarged by a glass annex forming a winter garden intended for a permanent sculpture gallery), and the Galliera Museum, where are already installed the fine tapestries, still little known to the public, which the Service des Beaux-Arts has had repaired at the Gobelins. This latter museum, as we have already said, is to be almost entirely reserved for industrial art, which is now receiving great attention everywhere. We are happy to state that, thanks to the energetic impulse given by its President, M. George Berger, the "Union Centrale des Arts Décoratifs" has at last entered

* We wonder how often we shall have to call attention to the notice which has stood for years under "Notices to Correspondents," to the effect that we decline to print letters unless authenticated by the enclosure of name and address, whether for publication or not.

on to the right path, in looking after the interests of modern industrial art. Thus it has just been determined that all the resources at its disposal are, for the next five years, to be devoted to the production of objects of art intended to figure at the Exhibition of 1900, and which are all to bear the names of their authors, whatever may be the rank of the latter in the hierarchy of decorative industrial art. The Museum of Decorative Art has just come into possession of some new and interesting objects. Among these are eleven models of animals, sculptured by Cain for the decoration of the Château of Chantilly, which have been presented by the Duc d'Aumale; a fine collection of Oriental faience; and a triptych on a gold ground, which forms a curious specimen of German art of the fifteenth century.

It was announced the other day in the *Builder* that M. Raoul Verlet had obtained the first premium in the competition opened by the town of Angoulême for the erection of a monument to the memory of President Carnot. This young and very clever artist has also been commissioned to execute the monument to Guy de Maupassant, which the Municipal Council have ordered to be erected in the Parc Monceau. This monument, the architectural portion of which has been entrusted to M. Deglane, comprises an exedra surmounted by a column carrying a bust of the novelist. On the bench of the exedra is seated a young woman, in very elegant modern costume, who appears to be in a reverie over an open book held in her hand.

People are beginning to be concerned in Paris about the danger which may arise to our trees and plantations in carrying out the scheme which may be adopted for the future Exhibition of 1900. The architects have out-rivalled each other in imagining fairy palaces on paper, almost all of which, in conformity with the programme, extend from the Champ de Mars to the Champs Élysées. Unfortunately the portion which they propose to occupy is one of the most charming bits of plantation in Paris. The fine plane-trees which border the parterre of the Quai d'Orsay and the long alleys of the Cours la Reine will alike be sacrificed. It would be too bad brutally to destroy, for the sake of constructions grandiose but necessarily ephemeral, the luxuriant verdure of this corner of Paris, the transformation of which was the glory of Baron Haussmann and of Alphand. The latter understood so well the importance of trees as one of the great charms of Paris, that he scrupulously respected them in his admirable scheme for the 1889 Exhibition. It is to be hoped that his successors will show a like spirit in respecting those promenades which are among the greatest ornaments of the capital, and that the Exhibition of 1900 will not be a mere agglomeration of palaces which will leave a desert behind them.

We have already announced the death of Jean Gigoux, the oldest of contemporary French painters, who has died quietly at the age of eighty-eight. He exhibited for the first time in 1831, and in the present year he sent to the Salon a portrait of a woman, of which the treatment and the colour betrayed not the slightest feeling of his hand through age. He was born in 1806, at Besançon, and, having studied design at the art school of his native town, he came to Paris to complete his education in 1828. His reputation dates from the Salon of 1833, where he exhibited his picture of "Henri IV. Écrivain des vers sur le Missel de Gabrielle d'Estree." He sent also to other Salons noticeable portraits. In spite of his success, however, he shortly after abandoned both *genre* and portrait painting in order to devote himself to historical painting. He painted at the Conseil d'État the "Charlemagne Dictant ses Capitulaires," which was burned by the Commune in 1871; at St. Gervais, a "Flight into Egypt," a "Repose in Egypt," an "Entombement," and a "Resurrection." He was at the same time occupied with drawing for engravers, and made a splendid set of illustrations for Gil Blas, of which it is difficult to procure a copy now. Gigoux had received medals in 1833, 1835, and 1848; he received a decoration in 1842, and was promoted as "Officier" of the Legion of Honour in 1880; he obtained also an important award in the Exhibition of 1889. He was a man of very charitable disposition, and was constantly employed in unostentatiously assisting artists who had been unprosperous in life.

Gigoux was a learned collector, and had assembled at his house in Rue Chateaubriand a number of works of special value and representing many schools of art. He had always expressed his intention of leaving this collection to the Louvre, and consequently there was much surprise expressed when it came out that by his will he had

left all these works, not to the national museum of art, but to the museum of Besançon.

Since the foregoing portion of this letter was written, the jury have given their award on the Exhibition designs, as follows:—Premiums of 6,000 fr. to M. Ch. Girault, M. Eugène Hénard and M. Paulin; premiums of 4,000 fr. to MM. Larche and Nachon, MM. C. Bernard and Cousin, M. Raulin, and M. C. H. Gautier; premiums of 2,000 fr. to M. Esquié, MM. Rey and Trouchet, M. Blavette, and M. Sortais; premiums of 1,000 fr. to M. Baumier, MM. Louvet and Varcollier, MM. Masson and Dédourbet, M. Jacques Hermant, M. Mesves, M. Thomas, and M. de Tavernier. As there are three first premiums, the award gives no clue as to the final selection, and we have yet to learn what design will be carried out.

A WEEK'S SKETCHING IN NORMANDY.

THE better the day, the better the deed. In spite, however, of the old proverb, Sunday is not the best day for a visit to Mont St. Michel; excursionists throng the narrow street and crowd the inns; but, as is often the case with French buildings on Sundays, the Castle and Abbey are open to all comers, and we spend the morning rambling through the galleries, ramparts, prison cells, and other buildings that go to make up a picturesque whole not often equalled. The guide is an old soldier, and moreover is one who can give other information than the usual patter, and one learns much, in reply to questions, about events that heretofore have been dry historical facts perhaps; here events seem real. We stand, or rather stoop, in the narrow cells so long used as prisons; we see the site of the iron cage of St. Michel, destroyed in 1777 by Louis Philippe, then Duc de Chartres; we see in the gateway the original iron portcullis, one of the very few still remaining; just outside, two cannon captured from the English during an ineffectual bombardment; and then we make our way up to the great church, which crowns the summit of the rock, with its fine Norman nave and fifteenth-century choir, the latter terminating in an apse of singularly beautiful design, then through a doorway into the thirteenth-century cloisters, with their very English detail, an endless field for sketches. We make our way down by the ramparts and innumerable steps to the small church in the one narrow street; mass is being celebrated, and we are confronted by a notice requesting strangers to remain outside during service. As almost the whole congregation consists of the peasant women, mostly in their short frocks, quaint white caps, and noisy sabots, the children each with a bunch of flowers, we feel that our garments will betray us, and the visit must be postponed. Making our way back to La Maison Rouge—who that has been to Mont St. Michel does not know this inn, and Madame Poulard, its charming hostess?—we sketch the view below us from the verandah outside the bedroom by way of a rest after the morning's climb, and the way of finishing our day, walk out on the causeway, where the best general view of the Mount is to be had.

Monday morning sees us on towards Coutances, for a long stay cannot be made even at Mont St. Michel when so much ground is to be covered in so short a time. Madame Poulard brings out her souvenir book, we add our quota, and say *au revoir* not without regrets, for we know we shall be welcomed nowhere else as we are welcomed here.

The bill, of course, has to be paid, and we are a little staggered to learn that no books are kept. "What have you had?" and we rack our brains to remember everything that we have ordered or consumed since arrival; so confiding a hostess must not suffer by her altogether delightful ways. Through pretty country—very different to that part of France travelled by most English on their way south, with its miles of poplars and flat horizon—we journey to Coutances; three or four stations before arrival the train has been filling up with peasants, in the cleanest and gayest costumes, and we learn that we are to see that charming old town at its very best. Monday is market-day, and who that has once seen Coutances on market-day can forget the scene? It is a long, steep climb from the station up the hill, but the whole place is alive and the bustle and noise is astonishing. The streets are crowded with two-wheeled carts, mostly driven by women, many of them covered with tilts of extraordinary size and of all tints, bright blue predominating; as we near the cathedral our pace slackens, and we pick our way

between the stalls and barrows with which even the bye streets are thronged; we turn the corner into the small market place and get our first near view of the cathedral towering up with its great western *façade* above all the jostling crowd below.

Specially striking at a first view is the sky-line of this front, for in addition to the twin towers and spires, two secondary towers or large turrets, crowned also with spires, flank the front, and greatly increase the breadth and dignity of the composition, as well as add to its picturesque outline. Two other features in this cathedral stand out prominently in the remembrance after even the briefest visit: the clever management of the apse, even in a district where the apsidal treatment is universal; and the beauty of the lantern-tower at the junction of nave and choir. This latter feature is one which seems to have pleased its designers mightily, for again and again in other churches, either in Coutances or in the villages round, copies more or less exact of this tower are to be found. In the great Renaissance church of St. Pierre, close to the cathedral, a curious and very interesting design is to be found; in which, with Late detail, almost identical treatment is employed. Of course, with such busy streets, sketching was almost impossible, and besides the scene was too pretty and animated to forego the pleasure of watching it and mixing with the people; so a hurried railway platform sketch the following morning was all that was attempted by one of the members of the party, the other members being content with equally-brief sketch-book notes of head-dresses and garments peculiar to the locality. A short journey *à pied* St. Lo brings Bayeux in sight, and here we stay but a few hours, the cathedral and the famous tapestry alone dividing attention. A quiet, peaceful old place, very clean, very sleepy, with one large inn and one small inn; in trying the latter we are agreeably surprised to get a capital *déjeuner* for 5 fr. the two of us—seven or eight well-cooked courses, finishing up with an abundant supply of fine peaches. This leaves an impression not altogether unfavourable to small inns, and one which is to be entirely justified by further experiences.

Starting by train again we pass the beautiful Breteville churches, one on either side of the line, and reach Caen, but as a long visit has been paid here previously we continue our journey to Lisieux, which is fresh ground as far as we are concerned. We arrive after dark, and get only glimpses out of the hotel omnibus windows of an old timber-framed house here and there, fitfully lit by the street lamps, and a dim outline of two great towers, one with a spire silhouetted against the sky, sufficient to make us long for our morning ramble through the old streets. However, dinner is welcome after the day's journey, and we are glad to find as we travel eastward that the eternal cider is giving place to the red wine which is to be our beverage for the rest of the trip. Next morning's walk through the streets of Lisieux soon showed us that the peeps of the evening before gave no idea of what really was before us; the charm of the cathedral is indeed great, but the charm of the old streets is greater. In some streets every other house is architecturally interesting; the only English town that in any way can be compared with Lisieux is Chester, but Chester has no the old-world air that is the characteristic of Lisieux, and nowhere in Chester is there such a street as the Rue aux Fèvres; here the inhabitants might with ease shake hands out of the second floors of the overhanging stories. A nasty, smelly street, it is true, and a pestilential place in which to sit and draw; but what a subject for an artist, the view of this quaint group of untouched Medieval houses! Not only the general view either, for the detail in moulding and carved work is exquisite in some of the houses, and the figure-work, though often grotesque and coarse, is refined and delicate in many examples. We were fortunate here, also, for on the Wednesday spent in Lisieux nearly the whole of the large square was covered with stalls and market-women; a fruit and vegetable market this, a market where immense ripe peaches went for two and three sous each. The market-square is a large one, and, though crowded, sketching could be indulged in, but from beginning to end a small knot of onlookers congregated; the general attitude is that of wrapt admiration; this, accompanied by occasional kissing of the finger-tips to the drawing on the part of the more enthusiastic individuals, and with the invariable addition of a complimentary little speech, and a bow on departure, such as only a Frenchman can give. Very pleasant is the reception that is accorded to the artist in France, provided that ordinary civility be shown in the

request for permission to draw; a little care in this respect ensures all possible facilities, and secures admission to house-tops and other advantageous positions for a sketch, which could not be obtained in any other way.

From Lisieux the journey is not a long one to Evreux, but the contrast between the two towns is great. Evreux gives to the stranger the impression of being new, of being clean, very clean, and has a general air of being well-to-do, whilst its cathedral is unlike anything before seen on the trip. The general view from the east shown in the illustration brings into prominence the chief peculiarity in the structure; that is the curious open-work spire. It is a wooden spire covered with lead, and has a most fantastic, though not unpleasant, effect. Contrast this Medieval open spire with the great cast-iron erection on the central tower of Rouen Cathedral, and the latter must certainly come off second-best. It is quite possible that the Evreux spire may have suggested the idea for its near neighbour at Rouen. Neither the iron nor the wooden spires at these two places are, however, to be compared to the stone treatment of the same idea—illustrated, for instance, in the western spires of that little-known building, Notre Dame de l'Épine, a church six miles from Châlons-sur-Marne. The town of Evreux presents another example of the parent idea in the cathedral, with its offspring in later buildings in the town and neighbourhood; in the market square the Belfroi showing much the same design and construction as in the cathedral spire; whilst in the Church of St. Taurin, also a resemblance in some details is to be traced. Dreux, our next stopping-place is less interesting; this late fifteenth-century church is nevertheless of fine proportion, and spacious, and the Hôtel de Ville is an imposing structure of the same period.

Chartres is before us, and the attractions of Dreux would be indeed great could they delay our departure for Chartres. Our arrival here, late in the evening of Thursday, was again a bit of good fortune; the whole place was alive with a great fair. As we were intending to stay till mid-day on Saturday the markets also would be in full swing before we left, and the markets at Chartres were by far the largest and busiest we had seen—four distinct markets going on simultaneously, bringing with the fair also—crowds of strangers into the place, and giving the town an air of prosperity which was very pleasant in the midst of general agricultural depression. Chartres is a great agricultural centre, situated as it is in the midst of one of the richest corn-growing districts in France. About eight o'clock, or a little later, in the evening we made our way up to the cathedral in order to get some idea, even in the darkness, of its magnificence and grandeur. A surprise was in store—the building was lit up; on entering by the town transept portals an extraordinary sight met our gaze. The whole of the vast building was crowded with people; and, amidst intense and reverent silence on the part of the great throng, a monk was preaching with a powerful eloquence which compelled attention. In a long brown frock, roped round the waist, with sandled feet and flowing white beard, he made a picture not easily forgotten. We paid our four sous and took possession of two seats where we might watch the scene and contemplate the magnificent interior, under circumstances not likely to be often repeated. Never before had the grandeur of the building appeared to us as it did now in the light of the flaring oil-lamps below, with the dim outlines of the groined roofs high over our heads, almost lost in obscurity and gloom. It was over all too soon, and as the crowd streamed out into the night we lingered, until one after another the lamps were extinguished, and we, too, departed, wondering whether daylight would have in store for us anything that could compare with the impressions we had just experienced. A visit to the cathedral next morning answered this question in a moment; for the altogether fresh beauty of the painted glass showed us, what we had had no idea of the previous evening, that nearly every window was a glory of gorgeous colour, such as we had never seen before. Sketching was out of the question that morning; no sketch could give the loveliness and sparkle of this glass. The interior of Chartres Cathedral is one of those places where one must not hope to work too much; it is a place to enjoy, and to moon about in; a place to see under different conditions of light; a place in which to take a morning view of the apse, with the eastern sun streaming through the great wall of painted glass which makes up the clearstory; a mid-day view of the nave and aisles; and last of

all, and, perhaps, best of all, the view of the western windows with the setting sun behind them, flooding the church from end to end with coloured light; nothing could be more beautiful than the rose window by Villars de Honnecourt seen under these conditions; it is a perfect treasure-house of architectural loveliness. And then for those who reverence such things there is the old twelfth-century miracle-working image of the Black Virgin, in the north aisle of the choir. As we see the crowd of devotees around, and the votive offerings which adorn this shrine, we find it difficult to realise that, but a hundred years ago, this image could have been crowned with the revolutionary bonnet rouge!

The church of St. Pierre would, anywhere else than at Chartres, receive far more attention than it usually does receive. The vastness of the cathedral, with its manifold interests, overpowers all else here, and yet St. Pierre would take front rank amongst fine churches. It is chiefly of early date, belonging to the thirteenth century, and possesses an abundance of painted glass, hardly less interesting than that in the cathedral.

From Chartres we turn our steps regretfully homeward, crossing Paris, where we must confess to forsaking architecture for shopping, and proceed from the Gare du Nord straight to Amiens. Here Sunday, the last day of our week's trip, is to be spent. Arriving late at night we tumble into the most comfortable of the various hotel omnibuses awaiting the train; but our purses are lighter and our hearts a little heavier before we leave the resting-place which had welcomed us; we like not the footsteps of the American tourist—they are not easy to follow. We did at Amiens what all visitors do; we *did* the cathedral, and we sighed a little for the freedom we had enjoyed when visiting other places; sketching was not pleasant, also, here, for the day was cold, and a very rapid sketch of the western portals exhausted all energy for outside work; so, with the addition of a little work in the marvellous choir-stalls, we sped on our way to Abbeville, where a final sketch of the picturesque church of St. Wulfran completed the sum total of our labours. "Better to have seen less and studied more" is the criticism of someone, and possibly a true criticism; but the trip was a very enjoyable one for all that. What is one to do when there are specifications and quantities and ancient lights and such like horrid things dunning and worrying one all day long? What can be better than the putting of all such things on one side, and with sympathetic companionship, note-book in hand, enjoying the travelling and rapid change of scene which such a week's sketching in Normandy can give?

ARNOLD MITCHELL.

ALMANACS AND DIARIES FOR 1895.

As usual, Messrs. Hudson & Kearns, of 83, Southwark-street, S.E., have sent us a parcel of their diaries and blotting-pads for the present year, the excellencies of which most of our readers must be aware. There are no novel features in either the diaries or pads this year, but novelty without utility in such works no one can desire, and it seems scarcely possible to improve either diaries or pads. In addition, however, to the usual information which each of the diaries contains, including the list of district surveyors for London, and cases tried in the Superior Courts during the legal year, from November, 1893, to August, 1894, a revised list of regulations under the London Building Act of 1894 has been inserted. "The Builder's Diary," No. 11, and the "Diary and Note-book," No. 6, contain much of the information which is to be found in the "Architect's Diary," issued in two sizes, Nos. 12 and 13, but they are specially designed for the use of builders and contractors. In the section devoted to lists of officers of London and provincial architectural and archaeological societies there are some unaccountable omissions, several provincial architectural societies not being mentioned; but this appears to be the only defect in these admirable diaries, though we could wish that Messrs. Hudson & Kearns would not insert advertisements with the information which their diaries contain. The same firm also send us some date-indicating blotting-pads, in various styles and sizes, all of which must be exceedingly useful and handy.

"The British Almanac and Companion" for 1895 (London: The Stationers' Company), in addition to the calendar, the usual contents relating to public offices and departments, and Acts of Parliament passed in the last Session (with abstracts of the more important ones), contains Mr. R. Langton Cole's usual review of architecture in the past year. The article, which

describes most of the more important buildings erected or being erected in London and the provinces during the year, after referring to Mr. Beresford Pite's recent address to members of the Architectural Association, proceeds as follows:—"An echo of the self-same feeling comes from an architectural school in the Colonies, where, we are told, the students are taught to study the principles of beauty in architecture rather than the forms which the application of such principles have produced in the past—a course so distinctly practical that it must commend itself to all. That an increasing number of new buildings are being erected in harmony with these ideas is obvious, and that the change is welcome will be denied by few. 'Style,' rigid, inexorable, founded on precedent alone, is less than ever in evidence, and a modern architecture is taking its place, framing its designs on an expression of the structure, and clothing it with varied ornament, new as well as old." The same work also contains articles on Art, by Mr. Cosmo Monkhouse; Engineering, by Mr. Langton Cole; and Science, by Mr. E. W. Maunder.

From Messrs. W. H. & L. Collingridge (*City Press Office*, Aldersgate-street) we have received "The City Diary, 1895," a convenient and handy little annual, containing much information specially relating to the Corporation of London and to City institutions. This is its thirty-second year of publication.

"The Railway Diary and Officials' Directory" (London: McCorquodale & Co., Limited) for 1895 is a useful work, containing a great deal of information as to traffic returns, accounts, dividends, list of officials, &c. "The Railway Almanac," issued by the same publishers, is a useful sheet of information.

"Calvert's Mechanics' Almanac and Workshop Companion" (London: John Heywood) for 1895 is the twenty-second annual issue of a very useful little work, containing information of especial interest to artisans and handicraftsmen. The work is illustrated with diagrams, and is to be obtained for 4d.

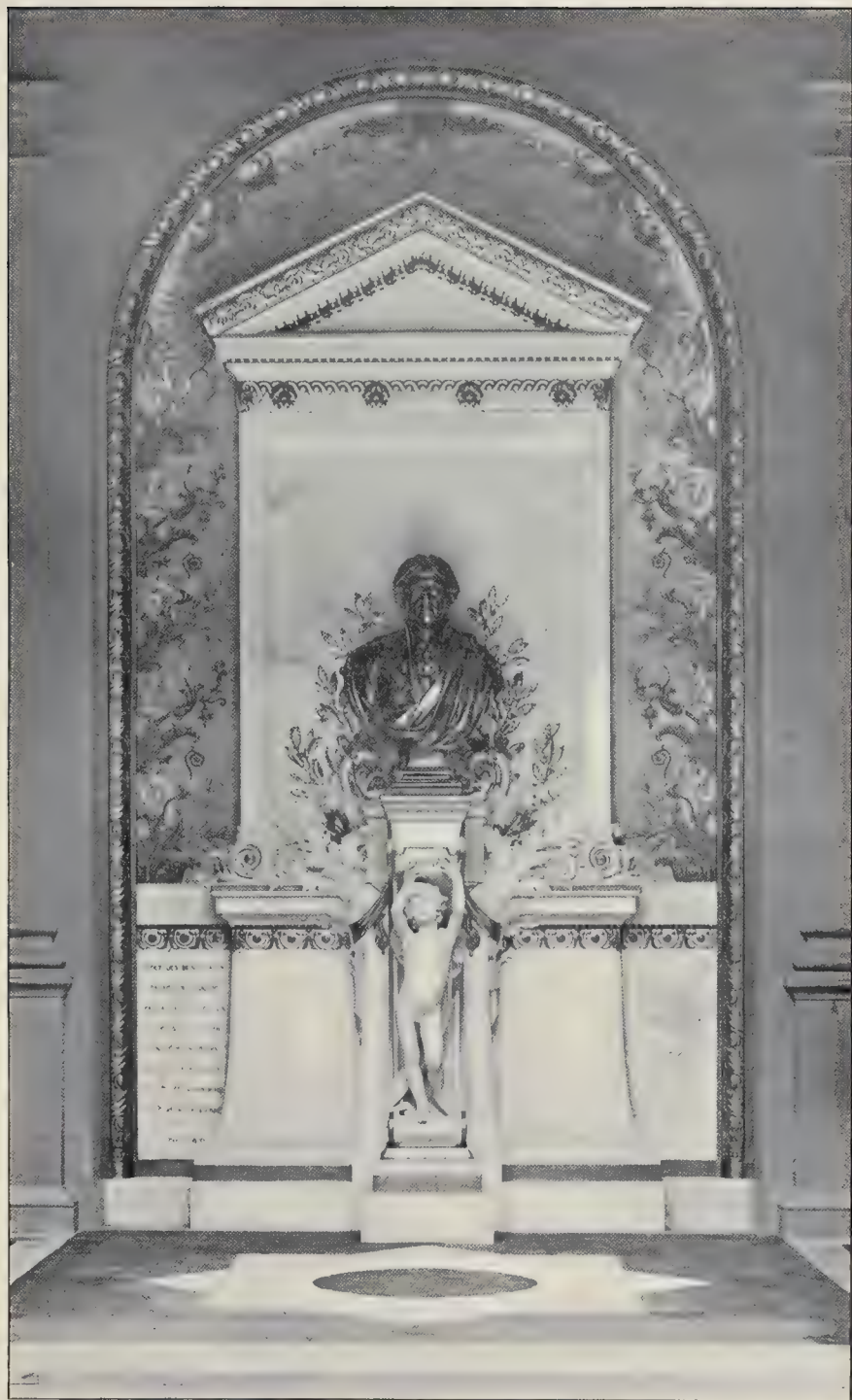
"The Indian Engineer's Diary and Reference Book, 1895" (1, Victoria Mansions, S.W.) is issued at the remarkably-low price of 1s. It contains useful information relating to thermometers and barometers, for the founder and smith, the glazier and painter, plasterers, plumbers, slaters, on hydraulics, water-supply, ropes and chains, besides a great deal of matter of a more general character. An interesting article on "India as a Field for Industrial Enterprise" is given in the diary. The cover of the annual has this year been stamped all over with advertisements—an undesirable departure, in our opinion, though it may be a profitable one.

THE POST OFFICE LONDON DIRECTORY.

"The Post Office London Directory for 1895" (London: Kelly & Co., Limited), is the ninety-sixth appearance of that indispensable and increasingly-bulky work. It is, as usual, corrected close up to date, and though no new feature has been introduced in the present edition, a very large number of telegraphic addresses and telephone numbers have been inserted in the Commercial division, showing a considerable increase over former editions. It is hoped to secure for future issues the registered telegraphic address and telephone number of every business house and professional man of any standing. The map is again strengthened by being mounted on linen, and the Directory has increased by ninety pages (2,973 pages against 2,883). As we remarked when reviewing the Directory last year, it is singularly free from mistakes, and the one or two lateral errors which we noticed in the previous edition have been corrected in the present one.

STUDENTS' DRAWINGS FOR PRIZES AT THE INSTITUTE.

As the announcement of the awards in the various Students' competitions will be made at the Institute meeting on Monday night, we may mention that it is always a pleasure to us to publish any of the designs to which the more important prizes are awarded, and if any of the authors of such designs wish for their publication in our pages, they have only to send their drawings. It seems desirable that it should be understood that we are not any less interested in Students' Designs, or less willing to find place for them, than those who adopt a system of "touting" for them which we do not wish to employ.



MONUMENT TO DUBAN, AT THE ECOLE DES BEAUX-ARTS, PARIS.

M. E. GUILLAUME, SCULPTOR; M. BERNIER, ARCHITECT.

Illustrations.

MONUMENT TO DUBAN AT THE
ÉCOLE DES BEAUX-ARTS, PARIS.

MONUMENT referred recently to the erection and inauguration of this monument to one of the most eminent French architects of modern times, of which we give this week an illustration reproduced from a photograph specially taken for *The Builder*. The monument is situated in the vestibule immediately preceding the theatre (the "Hemi-cycle") made famous by Delaroche's great painting. The treatment, as will be seen from the illustration, is of rather a novel kind, and is a good illustration of the refined taste which our French neighbours exhibit nowhere more frequently than in the design of personal monuments.

The architectural erection terminating in a pediment, which forms the background to the bust of Duban, is in white marble, the upper portion being relieved against a gold mosaic ground, adorned with ornament of a Greek type executed in coloured mosaic. A pretty figure of a child appears to hold up, caryatid-fashion, the corbel carrying the bronze bust. The marble panels on either side are carved in low relief, the one with a Doric capital and some emblems of the architectural workshop, the other with a palm branch and a list of the principal buildings constructed or restored by Duban; the list including the *École des Beaux-Arts*, the *Louvre*, the *Château de Blois*, the *Sainte Chapelle*, the *Hôtel de Pourtales*; to which are added the dates of his birth and death (1797-1870).

The architectural portion of the design is the work of M. Bernier, and the bust is by M. E. Guillaume.

"SO SIR LAUNCELOT TOOK SHIP AND
WENT OVER TO FRANCE."

IN asking Mr. Patten Wilson, whose clever and original drawings in black and white of Medieval subjects had attracted our attention, to make a drawing of such a subject for our New Year's number, we had naturally assumed that he would have chosen a subject in which architecture was a prominent feature, though we did not make any special stipulation to that effect. We do not think, however, that any apology is necessary to our architectural readers for presenting them with Mr. Wilson's powerful and picturesque study of a ship of the period of the Arthurian legend. If not architectural, it is at least archaeological and constructive.

The dragon at the stern was, of course, the emblem of Arthur's rule—

"The dragon of the great Pendragonship" *—the ship being one of the "King's ships" of the time. The provision for lighting the landing-stage at night is seen in the fire-grate or cresset fixed on the top of its timber supports; and in the foreground Sir Launcelot's luggage is conspicuous by the heraldic lions embroidered on the coverings. Whether Sir Launcelot, who is seen leaning on the mooring-post by the ship, really "took ship" in complete armour, may perhaps be questioned; there was probably, even in Arthurian days, something analogous to the tweed suit for such occasions.

The choice of the subject coincides rather oddly with the fact that five of our other illustrations represent French work, ancient or modern; but the symbolism is accidental, not designed, and it is not to be assumed that Sir Launcelot "went over to France" because he was discontented with English architecture.

We hope that on another occasion Mr. Wilson will give our readers his idea of a castle of Arthurian legend.

RICHMOND PALACE.

IN our description of Nonsuch Palace, we pointed out that very little history was attached to that building. It is, however, quite a different case with Richmond. After the Tower, Windsor, and Westminster, Richmond was the most historic of all the royal palaces in this country. It came, however, to be looked upon rather as a fatal residence, from the number of kings and queens who died within its walls. They were Edward III. in 1377; Queen Anne of Bohemia, wife of Richard II., in 1394; Henry VII., 1509; and Queen Elizabeth, 1603. I think Henry Prince of Wales, son of James I., also died at Richmond.

Richmond; or, as it was formerly called, Sheen, appears to have passed into the hands of the Crown in the time of Edward I. The Palace was rebuilt by Henry V. In 1499 it was destroyed by fire, and immediately after rebuilt, but was again destroyed, or greatly injured by fire in 1509. A commission was issued in 1649 to value the building for the purposes of pulling it down. This act of Vandalism was not, however, perpetrated at that time, and the account left by the Commissioners is remarkably interesting, as it gives us the names, positions, and, in most cases, the measurements of the principal apartments.

James II. appears to have been the last king who regularly inhabited Richmond Palace, and probably the long range of buildings on the left upon passing through the gateway from Richmond-green, are his work.

Very little of the old palace now remains; it has been destroyed bit by bit since the time of James II. The arch of the principal gate, with the much-decayed scutcheon of Henry VII., and a building on the left of the gateway, with a semi-decagonal projecting bow and brick walls, ornamented with a portcullis, in black headers (one of the cognisances of Henry VII.), is, for the most part, original. Within the great court also a little gabled structure adjoining the gate to the left is partly old. The footings of old stone buildings can be traced all along the opposite side of the court. This range of buildings, we are informed by the report of the Commissioners, consisted of the "Middle Tower," or gate leading to the inner court, a building containing the stairs leading to the great hall, and the Lord Chamberlain's lodgings. The hall and chapel were on opposite sides of the inner court, and were, like all the inner court and principal buildings of the palace, built of cut stone. The hall was 100 ft. long and 40 ft. broad; it had a clock-turret over the east (or rather north-east) gable, and a louvre in the centre. The chapel, which was on the opposite side of the inner court, was 96 ft. by 30 ft., and was on the second story, with the wine-cellar and lodgings of the grooms-porters, below it. It was furnished with "cathedral seats and pews" (probably stalls), "fayr lights" (stained glass), and "a fayr case of carved work for a payr of organs."† The west (south-west) side of the inner court was formed by two stone galleries, one over the other, and to the west (south-west) was the magnificent range of buildings containing the privy lodgings, or apartments. The report tells us that this structure was all of stone, roofed with lead, three stories high, with twelve great rooms in each story.

"The middle storie contains one room called the lobby, arched over head (vaulted), and covered with lead." In the middle of the roof is a fayr lantern, "fourteen turrets all covered with lead," and in the middle is a court, 40 ft. long and 24 ft. broad, which renders the rooms which lie inwards light and pleasant. One round (twelve-sided?) structure of freestone, called the "canted tower," four stories high, covered with lead, and embattled; the lower story containing a cellar, four large rooms over it, one above the other, and a stone staircase of 120 steps. "This tower is the chief ornament unto the whole fabrick of Richmond-court."

The fourteen turrets covered with lead are said to have been "a very graceful ornament to the whole house and perspicuous to the country round about."

To the north-west of the great hall was the livery kitchen, "with a great spired turret of lead and four ranges," attached to which was a courtyard of brick containing the offices. On the opposite side was "the privy garden," enclosed by a great gallery running from the "privy building" eastward, 200 ft. long; by the chapel and buildings of the great court on its north-west side, and by the buildings which still partly exist on the north-east, so that in reality the privy garden was enclosed within a vast courtyard. In the south corner near the privy apartments was a very small house of Observant Friars, who served the chapel of the palace. The site is still called "The Friars." After the Reformation this building was let out as a chandler's shop, which is strange after the experiences of fire which they had gone through at the palace.

There are a fairly good number of views of the old palace extant. The earliest is probably that engraved by Jodoc Hondius, dated 1610, in

* Lyons says it was 40 ft. wide, but in the "Monumenta Vetusta," which he quotes, it is stated to have been 30 ft. wide.

† A "payr of organs" simply means an organ. See Hill's "Organ-cases and Organs of the Middle Ages."

Speede's "Surry." This is from the river, and shows the privy apartments and hall. In Aubrey's "Surrey" is a much more accurate-looking view, engraved by Gutch, showing, in addition to the above, the "liverie kitchen" and offices. The almonry is shown in ruins some way to the left of the kitchen.

There is a large engraving by Basire, 1765, in "Vetusta Monumenta," the architecture very coarsely and incorrectly represented. Curiously the "canted tower" is here represented as round, though it is distinctly polygonal in Aubrey's view! The great kitchen is very distinctly shown, and the friary at the opposite end. This engraving is from a picture "in the possession of the Earl of Cardigan."

A second engraving representing the palace from the Green, engraved by Basire, from a picture "in the possession of Lord Fitzwilliam," is given in "Vetusta Monumenta." Lyons doubts about this view, and thinks it does not represent Richmond Palace, but we see no reason whatever for this. The gate, "the middle tower," the "canted tower," &c., are all shown, though not in the most correct perspective.

It is indeed sad to think that so fine a palace should now only be represented by a ruined archway and a few brick walls converted to the use of ordinary dwelling-houses.

H. W. B.

VIEW AND PLAN OF FOUNTAINS
ABBEY.

THESE, which form number VIII. of our series of illustrations of Abbeys of Great Britain, are treated of in the leading article on another page.

The plan is reproduced, by the kind permission of Mr. J. Arthur Reeve, from the one given in his monumental work on Fountains Abbey, referred to at the close of our leading article. The view is made, as usual, expressly for our series of Abbey illustrations, and is taken from nearly the extreme east end of the building; one of the two central piers of the Nine Altars Chapel appearing in the foreground of the picture.

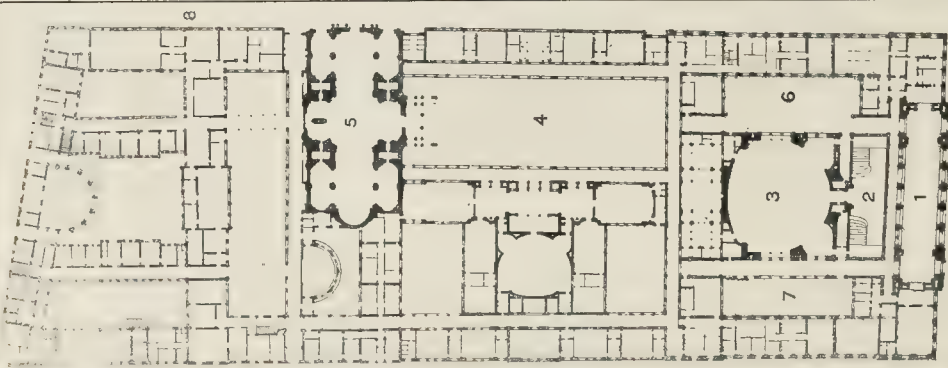
WHITBY ABBEY.

THIS view of Whitby Abbey was sent to us by Mr. Slater at the same time with his other drawing of the Abbey, which was published in the *Builder* of Oct. 6, 1894, as one of the series of illustrations of the "Abbeys of Great Britain." We could not find space for both drawings at that time; but considering the extra drawing of Whitby was too good a one to lose, we give it as an addition to our illustrations in the present number.

THE NAVE, MILAN CATHEDRAL.

The nave of Milan is perhaps the most impressive part of one of the largest churches in the world. It is about 55 ft. wide and 160 ft. high. The vaulting is painted in imitation of carved stone, but this decoration has now much perished. The church was founded about 1380 by Gian Galeazzo Visconti, and was built of marble by German and Italian artists. It was consecrated by San Carlo Borromeo in 1577. The west facade was not finished until the time of Napoleon; when it was left as a very mixed and incongruous piece of architecture, a medley of Gothic and Renaissance detail. As we need hardly remind our readers, the front was to have been rebuilt, and a great competition was held for this purpose. The death of the talented young architect whose design was selected seems, however, to have brought everything to a standstill, and it is doubtful whether the rebuilding of the facade will now be carried out at all.

Milan Cathedral is a remarkable instance of a building which commands great and general admiration (though perhaps more from the general public than from architects) in spite of a very corrupt style and very bad detail. The painted tracery on the vaults, to which reference has been made, is in itself a proof how little the true spirit of architectural work was appreciated by those who erected the building. Yet Milan has secured general admiration and even enthusiasm by mere dint of great scale and lavish richness of detail. It is a kind of building which seems to assert its right to be, if not above, at least on one side of, the severe standard of architectural criticism. If it is not altogether satisfactory as architecture, at all events it makes a rich and sumptuous architectural picture, such as inspired our late great Poet-Laureate with a verse which will last as long as the English language lasts, and which is so familiar by constant quotation that we need do no more than refer to it here.



Plan of the New Sorbonne, Paris.

1. Grand Vestibule.
2. Grand Staircase.
3. Large Theatre.

4. Principal Courtyard.
5. Chapel of the Sorbonne.
6. Secretary of the Faculty des Arts.

7. Secretary of the Faculty des Sciences.
8. Faculty des Lettres.
9. Faculty des Sciences.

THE NEW SORBONNE, PARIS.

THE new Sorbonne buildings at Paris, of which a plan is subjoined, and of which three illustrations are published among the plates in our present issue, have been carried out by M. Nenot, a former pupil of M. Questel and M. Pascal, who obtained the commission as the result of a competition instituted by the Municipality of Paris, in which twenty-eight architects took part. The cost of the buildings has been borne partly by the State, partly by the Municipality of Paris. The latter body has in addition undertaken the cost of the sculptural decoration, which up to the present date has amounted to 155,000 fr. The cost of all the pictorial decoration has been borne by the Ministry of Fine Arts.

The building, bounded by the Rue St. Jacques, Rue des écoles, Rue Sorbonne, and the Lycée Louis le Grand (or perhaps we should rather say by the Rue Cujas), occupies a superficial area of 23,590 square metres. The establishment includes within its walls the Académie of Paris and the "Faculties" of Literature, Science, and Theology.

The large theatre, of which a view is given, is reserved for University gatherings and solemnities. It will seat 3,000 persons, and is decorated with a very large painting by M. Puvis de Chavannes. The ceiling medallions in each bay are by M. V. Galland. The niches between the galleries are adorned by six statues: "Rollin," by M. Chaplain; "Descartes," by M. Coutan; "Robert Sorbon," by M. Crank; "Lavoisier," by M. Dalou; "Pascal," by M. Barrias; and "Richelieu," by M. A. Lanson. There are two other theatres set apart for the Service of Free Education.

The department of the "Faculté des Lettres" includes, besides the examination rooms, the halls for lectures and study, and five theatres for the public.

The Faculté des Sciences has no less than ten theatres; three for mathematics, three for chemistry, one for geology and mineralogy, one for natural science, one for physiology, and one for physical science. The Faculté de Théologie has two theatres. The whole twenty theatres can accommodate altogether about 10,000 persons, besides the seat room in the examination halls, which are also accessible to the public.

Independently of the large theatre (the one represented in one of our plates) the artistic decoration of the building may be grouped as follows:

Sculpture.—Principal façade, two large pediment subjects, by M. Mercie and M. Chapu, representing Science and Literature. Eight allegorical statues above the attic, viz.:—"Chemistry," by M. Injalbert; "Natural History," by M. Carlier; "Physics," by M. Albert Lefevre; "Mathematics," by M. Suchetet; "History," by M. Cordonnier; "Geography," by M. Marquette; "Philosophy," by M. Longepied; and "Archæology," by M. Paris. In the grand vestibule there are:—"Homer," by M. Delaplanche (the figure shown on the right of our view of the vestibule), and "Archimedes," by M. Falguière. On the grand staircase:—"The Republic," by M. Delhomme. In the Rector's vestibule:—"The University of France," a seated figure, by M. Allar.

Painting.—On the grand staircase:—"Les Fastes de la Faculté des Lettres," by M. François Flameng, and "Les Fastes de la Faculté des Sciences," by M. Chartran. In the Académie Council-room: five large panels by M. Benjamin Constant (the largest of these, giving the portraits of the Rector and of the Deans of Faculties, was illustrated in the *Builder* some time ago). In the adjacent Salons: Two large panels by MM. Wencker and Lerolle, representing respectively "The Laying of the First Stone of the Sorbonne," and "Albert the Great and his Pupils." In the Reception-room, paintings by M. Cazin; in the Rector's dining-room, allegorical paintings by M. Raphael Collin; in the Salle des Actes, paintings by MM. Duez and Jobbé-Duval; and in the Committee-rooms, large compositions by M. Lhermitte and M. Roll.

The vestibule to the grand staircase, which forms the subject of one of our illustrations, opens from the principle façade towards the Rue des Ecoles. On its right opens a long gallery forming the corridor of communication for the Faculté des Lettres; on the left, a parallel gallery communicates with the department of the Faculté des Sciences. Part of the grand staircase is seen through the arcades.

The old chapel of the Sorbonne has been retained among the new buildings (see plan). It contains, among other objects of interest, the splendid tomb of Richelieu, sculptured by Girardon, after the designs of Lebrun.

The illustrations of the new buildings are from photographs specially taken for us, and the plan is reproduced from one kindly sent to us by M. Nenot, the architect.

THE NEW HAMBURG TOWN HALL.

THE site for the new Hamburg Town Hall has been the subject of incessant discussion for the last fifty years. And even now that the pile is nearing its completion the citizens cannot desist from constantly debating on the pros and cons

* Some information as to the site of the new building carrying the dome will be found in a letter by J. A. Randolph, accompanied by a sketch plan, published in the *Builder* of March 31, 1894.

which governed the decision of their senators when choosing the ground some ten years back. The great Hamburg fire which destroyed the old Town Hall, and with it over twelve hundred houses, occurred in 1542. Almost directly after this catastrophe, the special commission, which was entrusted with the remodelling of the city, had to face the difficulty of finding a suitable site for the Hôtel de Ville, proposed at the time, which was to contain the administrative offices, as well as legislative chambers and reception halls, of the historical Hanse State. Mr. William Lindley, acting as chief architect and engineer for the Hamburg Senate, Sir Gilbert Scott, who was entrusted with the reconstruction of the St. Nicholas Church at Hamburg, and Herr Gottfried Semper, among others, were consulted, and we give blocks showing Lindley's and Semper's ideas as to the position (figs. 1 and 2).

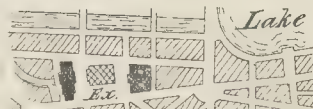


Fig. 1. Lindley's Proposal.



Fig. 2.—Semper's Proposal.

Semper, as will be seen, had an ambitious scheme of a "forum," around which he intended to group all the more important public buildings which had to be replaced.

The existing Exchange building (erected 1839), though completely surrounded by the fire, had

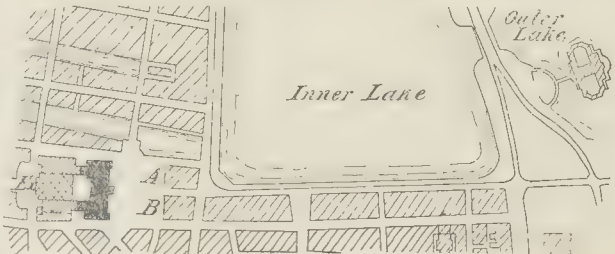
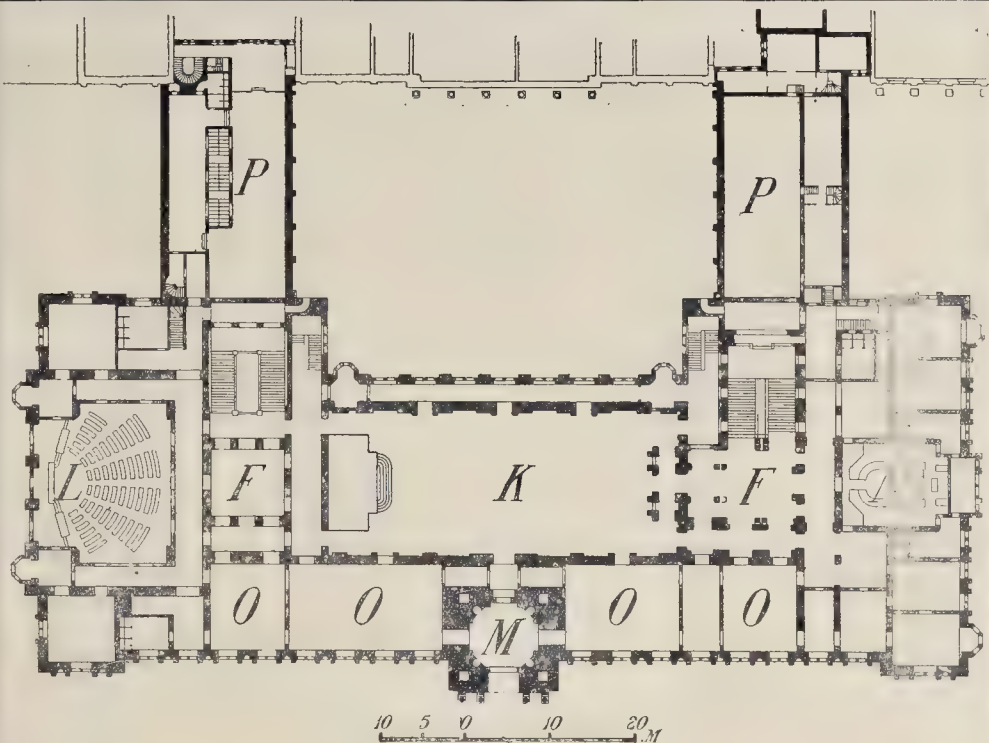


Fig. 3.—The site as arranged.



Hamburg Town Hall.—Plan of Principal Floor.

F Grand Staircases.
K Grand Central Hall.

L Council Chamber (Common Council).
N Council Chamber (Senate).

M Ante-Room.
O Committee Rooms.

P Offices

been saved by a spirited party of citizens, and there was always an intention of having the new Town Hall in possible proximity to what is practically the seat or heart of Hamburg life. As the Exchange was a low building, of good Italian Renaissance style, treated very lightly, and a Hôtel de Ville for a Hanse city must apparently necessarily be a ponderous block, showing the scrolled "German Renaissance" lines, there was always the difficulty of an unpleasant contrast to be feared; whether the blocks stood side by side, or opposite, or had to be contiguous, the difficulty remained. The final decision was to put the buildings back to back with a spacious courtyard between them, but the wings joined. Placing the buildings back to back was certainly a good expedient, but we doubt the advisability of having attempted to join the wings. Seen together the side frontages contrast oddly, and the Exchange is entirely dwarfed. The same remark holds good for the appearance of the side elevation of the courtyard, though perhaps in a lesser degree.

The actual position and aspect of the new Town Hall is shown in fig. 3. The Exchange faces a crescent, and the Town Hall has its main frontage on a market-place, measuring about 100 yds. by 150 yds. The thoroughfares on either side of the block are 65 ft. wide. The building can certainly be seen with advantage from several points, and the glimpse of the Alster Lake to be had from some of the windows is pretty. Both aspect and view would, however, be greatly improved if the houses marked "A" were removed, and preferably also those marked "B." This will probably be done when the Hamburg exchange is in a more satisfactory condition.

The requirements to be fulfilled by the new Town Hall, and its design, were the outcome of much tedious controversy for full thirty years (1855-1885). There was a great international competition for the design in 1856, when the housing of all the administrative departments was required, as well as the legislative chambers and reception-halls. Forty-four architects competed, and Sir Gilbert Scott received the first premium. After much wrangling, and a postponement of the question during the wars of 1864, 1866, and 1870,

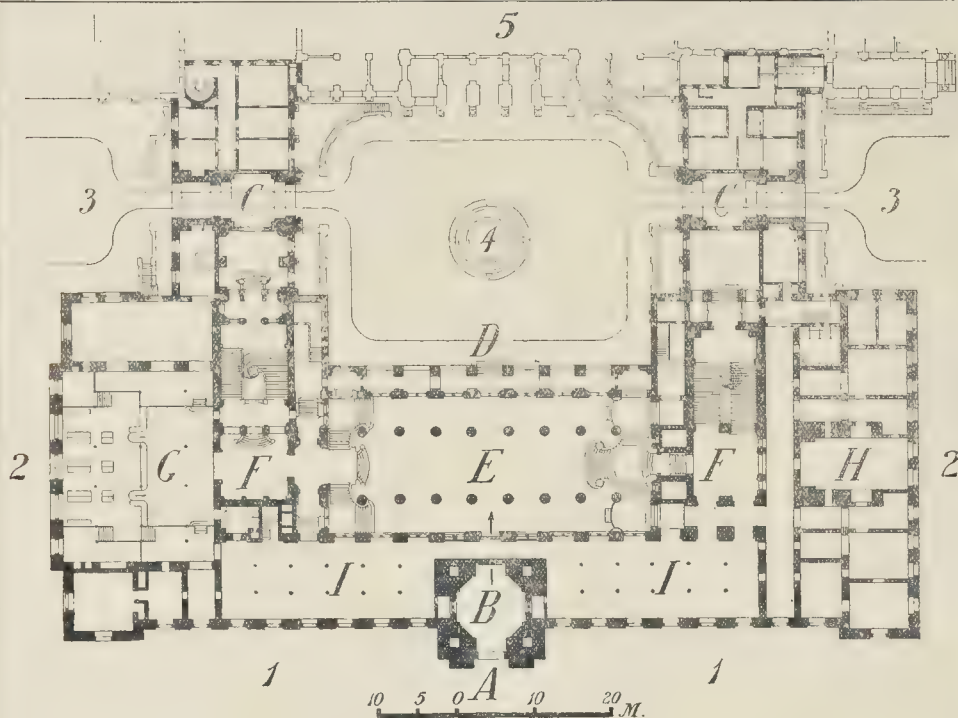
there was again a competition in 1876, in which Messrs Mylius and Bluntschli received the first premium. A number of Hamburg architects received minor awards on this occasion. In this instance only a part of the administrative offices had to be found room for. The winners were then invited to revise their design, but owing partly to the difference of opinion as to the object of the block, and the opposition by local men, Messrs. Mylius and Bluntschli were unsuccessful in obtaining the commission.

To guard against an outsider getting the commission, and also to put an end to professional rivalries, for which Hamburg is noted, the nine leading architects of the city joined hands in 1880, and prepared a joint design for the Hôtel de Ville. The "programme" they had themselves prepared wisely limited the accommodation to two council chambers, a large central hall, ample foyers, and the necessary offices for one or two of the principal departments only (Secretary's Office, Finance Department). Most of the administrative offices were to have their own buildings close by. These were to have the character of office blocks only, whilst the Hôtel de Ville was to be the "show-place" of the city. Again there was opposition, an architect who had a seat in the Common Council distinguishing himself by a vigorous and unprofessional attack on his *confrères* who were submitting the design. Finally, the proposals were, however, accepted, and in 1885 230,000*l.* was voted for the cost of the building, and the joint architects formally commissioned to commence the works. Messrs. Grotjan, Haller, Hanssen, Hauers, Lamprecht, Meerwein, Robertson, Stammann, and Zinnow designed the building. Of these, Messrs. Robertson and Lamprecht died before the foundation-stone was laid. A committee of seven has hence had charge of the final revision of the design and superintendence of the works. Of these, Herr Haller was elected to practically act as architect-in-chief. A joint works-office was formed, and Herr Geissler engaged as manager. Any supervision on behalf of the authorities was entrusted to the City Architect, Herr Zimmermann, and Messrs. Hennicke and Gros were retained as consulting engineers.

The main floor of the new building, which is some 33 ft. above the street-level, contains the Council Chamber of the Senate (N) on the one side, and the large Common Council Room (L), measuring about 66 ft. by 44 ft., on the other. Each has its own grand staircase (FF), but both staircases serve as the approach to the great central hall, the principal feature of the Hôtel de Ville. This hall (K) measures some 130 ft. by 65 ft., and is about 48 ft. high, and as will be seen from the plan, it is lighted by a row of seven large windows, looking out on to the courtyard. Their sills are about 16 ft. above the floor, so that a high side-light is obtained. There are recessed galleries on three sides. Off the central hall, with a frontage to the market-square, are the principal committee-rooms (OO), with some offices close at hand. The turret-chamber (M) has been used as an antechamber to the committee-rooms. The two wings are completely taken up by offices (PP).

Part of the ground-floor is only a few inches above the street level, and here the full height possible under a main floor has been made use of. Part of it is, however, cut up into a lofty basement, and an entresol. The great vestibule, which is vaulted, takes up the full height. Its main approach is from the market-place, through an outer vestibule (B) under the tower. There is a second approach from the courtyard, with a long open porch (D). Carriages can drive through the courtyard, and "put down" rapidly. On either side of the vestibule flights of steps lead to the grand staircases referred to. These have separate entrances (CC) off the *porte-cochères*, which lead to the courtyard. Off the one staircase, on the entresol level, a spacious reception-room (H) has been planned. This is specially reserved for hearing deputations and receiving distinguished strangers. Off the other the pay-office of the house exchequer (G) takes a prominent position. A number of offices (II) have been found room for, facing the market-place and side thoroughfares.

It would lead too far to refer to the other parts of the plan, and we need only mention that the Hanse "Rathskeller," with its spacious wine-cellar, has not been forgotten. Much room is



Hamburg Town Hall.—Plan of Ground Floor.

- 1 Market Place.
- 2 64-ft. Roads.
- 3 Forecourt.
- 4 Courtyard.
- 5 The Exchange.

- A Main Entrance.
- B Outer Vestibule.
- C Side Entrances.
- D Back Entrance.
- E Grand Vestibule.

- F Grand Staircases.
- G Pay Office (entrance).
- H Registry Office (entrance).
- I Offices (entrance).

taken up in a second basement for the extensive warming and ventilation arrangements.

Structurally there is little of interest in the building excepting the foundations. The block stands on a platform of concrete 39 in. thick, which is supported by 4,000 piles of an average length of 36 ft. The unnecessary thickness of the walls, and quantity of material in many parts, speak of much waste from an English architect's point of view, and a public body in this country would also grumble at the amount of waste space in the building.

The architectural treatment of the exterior of the block is exhibited in our illustration. The material of the façades is sandstone, in several tints, slightly picked out with gold. The plinth, however, is of Bornholm granite. The main entablature is about 75 ft. above the pavement level, and the top of the tower, nearly 325 ft. high. Much of the carved decoration is from Herr Peiffer's atelier. The figures are by Berlin, Hamburg, and Munich sculptors of standing. As to the interior, little can be said at present, excepting that the finest hard-woods are to be used, and the style will be similar to that of the exterior. The grand vestibule, which is entirely of sandstone, and is nearly finished, promises well, and the wine-cellars will certainly not be the least interesting feature of the building.

As regards the cost, in 1885 the estimates were limited to 250,000*l.*, and in 1889 the amount was increased to 330,000*l.* Particulars of expenditure up to date are not forthcoming, but including all sculpture, the fresco decoration, and the furnishing, 500,000*l.* will approximately cover the cost. At present there is some talk of the missing thousands being subscribed by the leading citizens of the town. Part of the block, with the Council-chambers and offices, will be ready for use next year. The central hall, however, is not likely to be opened until 1900.

ST. SAVIOUR'S CHURCH, SOUTHWARK.
The ancient nave of St. Saviour's, after many changes and various reparations, fell into a state

of great dilapidation in the early part of this century, and having stood roofless for seven years, was finally pulled down in 1830 to make room for the structure which has itself been lately removed to admit of the construction of a nave and aisles, which might be used with the choir and transepts as one church.

The late nave, built with a floor 9 ft. above that of the transepts, could never have been so used, even if its architecture had been of a suitable or worthy character.

The new nave has been built entirely on the original foundations, which were condemned as unsafe by the destroyers of the old one, although they themselves subsequently made large use of them. Considerable portions of the original walls and of the ancient details were found *in situ*, in taking down the modern church. All of these remains have been carefully preserved intact.

The present building is not intended to be an exact copy of the old nave and aisles as they existed at any particular date, but rather, while following the original plan, and carefully preserving and incorporating all existing remains of old work, to be in thorough harmony with the beautiful choir, so well restored by Gwilt before the destruction of the nave, and to be as well adapted as the exigencies of the old plan permit to modern requirements.

If an exact restoration of the building as it was at the beginning of this century had been desired, ample material and information for that purpose were to be found in Gwilt's elaborate and careful sketches and measurements now preserved in the British Museum. These, with a great deal more interesting matter, have been brought together in a convenient and handy form by Mr. Dollman in his beautiful work on St. Saviour's, to which readers may be referred for a full history of the church.

In the rebuilding Weldon stone has been used externally for the wrought work, the walling being faced with snapped flints. Internally, up to the top of the nave arcade, Ancaster stone is

used, and Bath stone above that level. The filling-in of the groining is of chalk, with bands of freestone. The floor is laid throughout with oak-block paving.

In clearing the site previously to building, remains of no less than three old floors were found at different depths, and none of them level. That finally adopted is 18 in. below the floor of the transepts, from which there was one step into the choir. On taking the transepts in hand, however, portions of the original floor were discovered 12 in. below the surface. This level has now been restored, and there will be one step from the nave to the transepts, and three from the transepts to the choir.

The whole of the work has been carried out by Messrs. Rider & Son on a schedule of prices accepted in competition with several other well-known firms.

Mr. T. Simpson is the clerk of the works, and the architect is Sir A. W. Blomfield, A.R.A. The drawing, by Mr. W. Monk, shows the view of the interior of the nave, looking westward.

ENGINEERING SOCIETIES.

INSTITUTION OF CIVIL ENGINEERS.—January 2 was the seventy-seventh anniversary of the establishment of the Institution of Civil Engineers, which was founded for the general advancement of Mechanical Science. It now numbers 1,846 Members, 3,647 Associate Members, 359 Associates, 17 Honorary Members, and 794 students, making a total of 6,660 of all classes.

CIVIL AND MECHANICAL ENGINEERS' SOCIETY.—At the meeting of the Civil and Mechanical Engineers' Society, held on the 3rd inst., a paper was read by Mr. A. W. Ackermann, entitled "Caissons versus Dock-Gates." The author said that caissons were apparently first used in France at the Port of Rochefort in the year 1728 A.D., and that there is some evidence of their having been used at a much earlier date by the Venetian Republic. The early caissons

were constructed of wood and heavily ballasted. Iron caissons were first used at H.M. Dockyard, Woolwich. No great improvement in their design took place until 1865, when the extension works of H.M. Dockyards, Chatham and Portsmouth, were undertaken by Sir Andrew Clarke, R.E., K.C.M.G., Director of Works for the Admiralty. The principles involved in designing caissons were explained. The advantages of caissons over dock-gates were pointed out. The difference between ship and sliding caissons was described, together with details of their construction and the machinery used in connexion with them. The paper was illustrated by diagrams.

INSTITUTION OF JUNIOR ENGINEERS.—On the 15th ult., a party of about seventy members of this institution travelled to Hampton, for the purpose of visiting there the stations of the Southwark and Vauxhall, the Grand Junction, and the West Middlesex Waterworks. They were conducted over by the respective officials. The Southwark and Vauxhall engines consist of two 80-in. Cornish beam, two inverted compound, three direct-acting Cornish, a triple expansion inverted, and an inverted compound, both the latter being geared to and driving two sets of three-throw low-lift pumps. The Grand Junction engines are of the following types:—Direct-acting single Cornish, compound beam, diagonal compound, horizontal compound, Worthington, and centrifugal, the latter being in course of erection. The West Middlesex engines are of the Worthington horizontal and vertical types. For the privilege extended in connexion with the occasion, the thanks of the members were conveyed by Mr. Harry Fraser, member of council.

Correspondence.

To the Editor of THE BUILDER.

THE LATE MR. GRIBBLE AND THE BROMPTON ORATORY.

SIR,—With regard to your notice of the late Mr. Herbert Gribble's connection with the Brompton Oratory design, I think I am able to say a word or two on the subject.

It was my good fortune to assist Mr. Gribble in the many working drawings forming the contract for this important and unique work, comprising, practically, the whole scheme, which though all included in the original and first estimates, was not all included in the signed contract for the work then executed.

I have no purpose in writing other than to say a word or two of praise for one of the ablest draughtsmen and designers it has been my good fortune to meet. It would indeed not be easy to say in a few words what power of architectural scholarship and dexterity Mr. Gribble possessed.

Every piece of work he took up from the detail most prominent to that which no one would see, received an attentive study and measure of labour which only the enthusiast could bestow. Proud as he might justly have been and was of his facility of expression as a draughtsman, his interest was equally alive in matters of detail and construction. It was, indeed, surprising to watch the progress of his detail drawings. He did not give the impression of being very rapid, and appeared to gain his results rather by patience and persistency. Every point was argued out as he proceeded, and difficulties were at once faced and for ever fought and conquered. His published drawings, notably the sketch from the top of the dome looking down into the church-below, was made by him as a recreation, and was not begun till the whole of the detail of that structure was thoroughly familiar to him as a settled and completed task.

As to the more difficult forms of construction with which the church abounds, and which were in effect practical experiments, no one can know how heavily these sometimes weighed upon him. It was no uncommon thing to hear in the morning that he had spent the night sleeplessly in thinking out this or that grave question. When it is remembered, moreover, that such a building as the Oratory was designed and carried out under our present contract system, with the conditions of cost as far as the structure goes reduced to the minimum, it will be readily seen that many questions of experimental construction would strain the strongest nerve, and especially that of a man who had really never before carried out himself any responsible building work. The tie-rods now to be seen in the main roof across the nave were never intended to be left in—and as I can only imagine that Mr. Gribble had a very good reason for not taking them out, as he had originally intended doing—after the concrete vault of the nave had settled down to its work. It should also be further remembered here that the problem is a semi-circular cement-concrete vault of 50 ft. clear span, 7 in. thick at the crown and 22 in. thick on the haunches, the whole largely penetrated by cupola-like openings, and the whole placed on the

top of the clearstory walls, with no great power of counterforts to resist the outward thrust.

For points of strictly architectural detail and design, such as orders, entablatures, cornices, mouldings, and the like, no one can know the patient trouble and research which led ultimately to a final decision. Several of the same orders of different old masters were placed side by side, drawn to similar scale, and considered in every detail to arrive at a result. The product of all this labour, as expressed in the finished work of the Oratory, seems to me as particularly praiseworthy, the more especially that Mr. Gribble, up to this time, was, if anything, a Gothic man, and this was his really first Classic work.

As I have said, I have been impelled to write this letter only from admiration, and chiefly so for the way in which Mr. Gribble worked to give his clients the best of which he was capable, and also from the very distinct feeling of kindness with which he ever received contributions to his work such as an assistant could give. It is, however, false to suppose that any assistant could ever help such a man beyond a very short limit. He insisted upon and did all his own initiation, and he worked with an enthusiasm which knew no bounds when the interests of the work were concerned.

Personally, I think Mr. Gribble would never have attracted a large class of clients. He was distinctly an uncommercial man, and perhaps his very enthusiasm was not always calculated to inspire the confidence which he really deserved.

I had not seen Mr. Gribble for several years, and the news of his death through your columns came upon me as a great shock. It is a lamentable circumstance that such ripe scholarship and dexterity to be taken away at the early age of forty-seven years.

I enclose my card (not for publication).

"ARCHITECT."

SOUTH SHOEBOURY CHURCH.

SIR,—The little Norman churches of Essex contain many interesting old features, while the very speech and manners of the inhabitants of the county have changed but little during the last few centuries, so that it would not be at all surprising to find survivals of old ritual arrangements in the churches. In Hadleigh Church, some eight miles distant from Shoebury, there is a fairly early Norman chancel arch with side recesses which may have been intended for the purpose suggested by Mr. S. J. Nicholl in your issue of December 29, and similar specimens exist elsewhere, as, for instance, at Brixworth, Northants.

But the recesses at Shoebury are clearly thirteenth-century insertions into a twelfth-century wall. Now, as Mr. Nicholl says, the Norman credence recess at Castle Rising was disused and turned into an altar recess in the thirteenth century, and this seems to suggest that the old use of such recesses had ceased by that date. Therefore it is hardly likely that niches would have been inserted at so late a date in order to serve as credences in this unusual position. Whether the niches in question replace Norman credence niches or not, I cannot venture to say. But in Rainham Church, near Barking, there is a chancel arch exactly like the one at Shoebury, both in proportion and in detail. The arch at Rainham has a thirteenth-century altar recess on the north pier, but there is no visible trace of a corresponding recess on the south side. The work at Rainham so closely resembles that at Shoebury that it seems extremely likely that the two buildings were works of the same designer, and this seems to point to there having been no Norman credences beside the chancel arch at Shoebury. Mr. Nicholl's theory, however, may doubtless explain the singular triple chancel arches at Hadleigh and elsewhere, although I do not think it is a very probable explanation of the example at Shoebury.

CHARLES A. NICHOLSON.

"AN OLD KIRK CHRONICLE."

SIR,—Referring to your review of the Rev. Mr. Waddell's book on Auldhaime, Tynninghame, and Whitekirk (page 475 of last volume), and the regret therein expressed that plans and technical descriptions were not included, will you allow me to state that detailed accounts and plans of Tynninghame Priory and Whitekirk were published in Part No. 3 of Vol. II. of the Edinburgh Architectural Association *Transactions*.

Copies of this Part I have no doubt can be procured from the Hon. Secretary, Mr. Thomas Fairbairn, 56, Queen-street, Edinburgh, by anyone desiring them.

Edinburgh, Dec. 31, 1894.

G. S. AITKEN.

ARCHITECTURAL STUDENTS AT THE ROYAL ACADEMY.

SIR,—It will interest many of your readers to know that the regulations for admission to the Schools of the Royal Academy have been altered, and that architect-students are now eligible for admission who are not more than twenty-five years of age on the date fixed for the delivery at the Academy of works for probationership.

This will be found a great boon to many now

that the range of study required of the young architect is so extensive.

Instruction in the Academy is gratuitous.

THOMAS H. WATSON.

The Student's Column.

BRICKS AND TERRA-COTTA.—I.

INTRODUCTION.

THE literature relating to bricks and terra-cotta is fairly extensive, but, practically nothing has been written on the subject, as a whole, in recent years, at least in England. Works on building materials generally have appeared from time to time, it is true, but these, for the most part, do not contain sufficiently detailed information, and add very little to our previous knowledge. Moreover, certain phases connected with it have never received consideration in any paper or book, though questions have frequently arisen thereon. It is impossible in the limited space at our disposal to write a text-book on either bricks or terra-cotta, and we shall not attempt anything of the kind. Certain facts concerning both these materials are well known to every student of architecture, and if they were not, any good book on building construction would suffice to supply the information. These topics, therefore, we have no occasion to touch upon. We cannot pretend to give the student a full bibliography, which would consist almost entirely of the enumeration of short articles and papers read before societies specially interested in these materials; but we hope to do justice to every original observer whose discoveries may be referred to, and we shall, naturally, quote the sources of origin of such references.

The *raison d'être* of this series of articles is to give a general account of the principal varieties of English bricks and terra-cotta, and, where there would seem to be any substantial advantage by so doing, to say something concerning them as manufactured abroad. We have stated that certain phases of the subject have never received consideration; it is to these that we shall specially direct the student's attention. They relate almost exclusively to our own investigations, and will form the most important original part of our present contribution to the literature on these building materials.

Bricks and terra-cotta may be considered from many points of view, the principal amongst which, for our purposes, are the following:—The raw earths; the methods of preparing them in the initial stages of manufacture; the machinery or means adopted of fashioning the prepared earths; and the way in which the fashioned products are dried, built up in the kiln and burnt. To properly understand these various processes it is necessary to possess some knowledge of chemistry, physics, mineralogy and metallurgy—at least in so far as the scientific preparation and burning of the raw materials are concerned. Many points important to the intelligent manufacturer must of necessity be treated here as briefly as possible, and only then with the ultimate view of enabling the architectural student to understand certain phenomena connected with the behaviour of the materials under definite circumstances. In our general preliminary observations, dealing with the raw materials of which bricks and terra-cotta are made, the two substances will be considered together, but subsequently, after running side by side parallel to each other for some time, they will be made to bifurcate, the bricks going one route and the terra-cotta another.

Then we shall describe in succession various chemical and metallurgical processes in so far as they affect the quality of both bricks and terra-cotta. The physical and other scientific attributes of the finished materials will be dealt with at some length, and will include a particular account of the strength of different kinds of bricks, showing the effects produced by divers methods of manufacture, especially in regard to shape. Their absorptive qualities will occupy some space, as also will their behaviour under varying temperatures, during conflagrations, &c., and in this connexion we shall introduce the results of many original experiments. In regard to brickwork, we shall not attempt anything like an essay on this subject, though it is our intention to treat of the strength of brick piers, walls, &c.—so far as that is known—and then we must say a few words respecting the influence of mortars and cements on the strength and bending of brick structures. Refractory substances, fire-clay, and the like will be alluded to not only in their capacity of producing ordinary building bricks,

but of special kinds for the lining of furnaces. We shall have to point out the geographical distribution of the principal brick-earths in England, and shall divide these into several groups, corresponding as nearly as may be with the centres of the burnt goods industry. We can barely touch on the influence of brick-earths in moulding the architecture of their immediate vicinity, though this is a subject that would well repay careful study.

Considerable space will be devoted to an account of the initial stages in the manufacture of both bricks and terra-cotta, and all the essential details prior to the actual burning will be explained. It is curious, but is, nevertheless, a fact, that the earths employed, and which, therefore, form the substance or body of the whole of the materials concerned, constitute the least understood section of the subject. This does not seem to be generally recognised, if we may judge from queries and observations made by competent persons during the past few years. You may elaborate the methods of preparation of these earths as much as you like; you may expend all your mechanical genius in inventing machinery to fashion various kinds of bricks in the shortest possible time; and you may know the "crushing weight" and tensile strength of every principal kind of brick in the universe; but unless you are cognisant of the precise nature of the raw materials used in the first place you will not make a first-class brick-manufacturer, nor produce a material sufficiently reliable in shape or colour for use in the better class of edifices. You may possess raw earths suitable for the best kinds of goods, and not know it. The architect ought to be extremely careful in purchasing bricks from those who do not possess the qualifications for manufacturing them homogeneously, and so that they shall be uniformly good. It is not too much to say that many brickmakers work only by "rule of thumb," and have not the slightest conception of the principles which underlie the various processes they adopt; the result of this is, that when the character of the raw earths used slightly changes (as it is very apt to do when worked over extensive fields) the quality of the bricks changes also without the manufacturer being able to control the matter, or even to turn the change to account where that might be done. The kind of experience gained by burning tens of thousands of bricks leads to the detection of little peculiarities attending their expansion, contraction, or warping, and is useful enough in its way, but it gains tenfold in usefulness when this knowledge is supplemented by a definite understanding as to the causes of those peculiarities. The principal modifications adopted in the manufacture of bricks during the last half-century are the outcome of scientific investigation, and were deliberately planned to bring about the results achieved.

A knowledge of the chemical properties of the earths is indispensably necessary, but we trust that very little notice will be taken of the majority of the commercial analyses distributed by brick merchants. They are all very well to give a general idea of the composition of the brick-earths used; when applied to the subject practically, however, they are found lacking in many important points, and can never take rank with a truly scientific chemical investigation. The microscope, as we shall show, may be employed to advantage in ascertaining the mineral nature of clays, and this, combined with the necessary chemical knowledge, will assist wonderfully in predicting the results of burning. It has its use also in enabling the student to gauge the quality of bricks for certain specific purposes. We shall make no apology for introducing a few observations on metallurgy. Neither a chemical analysis, nor a mineralogical examination can be estimated at its true worth unless the student is aware of the changes which take place in the substance on the application of heat. Some have insisted that the brick manufacturer should possess an intimate knowledge of physics. We do not go so far as that, but we do say that the more he knows of the behaviour of confined heat the better. The burning of bricks is, in a sense, a physical process, but a competent acquaintance with the rudiments of metallurgy suffices to explain all that, and a great deal more.

In reference to terra-cotta, the preparation of the raw materials is half the battle. The processes adopted in manufacture are, of course, of a much more refined nature than with bricks. Yet on a broad basis there is a great deal in common in the method of treatment of the two. The terra-cotta manufacturer is obliged to take more trouble in dealing with his commodity. It is very difficult to treat of terra-cotta from a

scientific standpoint, in which respect it differs very markedly from bricks. In many instances it is only a species of veneer, and serves to hide a mass of concrete made anyhow. Its quality, from a structural point of view, is only that of the concrete within, except that it, to a certain extent, protects the latter from atmospheric influences. In so far as it may do this it is useful, but under the circumstances it is almost impossible not to recognise that it is a deceitful product. A brick does not pretend to be more than it is; terra-cotta, on the other hand, does apes a superior material. Nevertheless, we must take terra-cotta as it is, and we shall minutely describe the raw materials used in its manufacture, their preparation, moulding, and final burning. The mode of weathering of this substance, together with the peculiar effects of temperature thereon, will also be considered.

The machinery used in making bricks, &c., calls for very little description in these articles, and will only be dealt with in connexion with the rudiments of the subject. It is desirable to do this for the student, and to comprehend the differences between a hand-made, wire-cut, or pressed brick. In other words, machinery will only be dealt with in so far as it may materially influence the quality of the finished product.

We may say that we do not mean to deal with earthenware goods, and so forth, but shall treat of "bricks" in the most limited acceptance of the term, and as purely structural materials. "Terra-cotta" will also be restricted to its use as a structural material only. We shall have nothing to say on the present occasion as to its artistic merits, or otherwise; our programme is already full enough.

Finally, nothing herein contained will be of the slightest interest to the makers or users of bricks employed in "ferry" building; we cannot undertake to go into details concerning the strength, mineral structure, classification, porosity, or chemical composition of materials mostly made of the *alta podrida* of town refuse heaps.

OBITUARY.

MR. HAROLD SWAINSON.—We greatly regret to learn the premature death of Mr. Harold Swainson, collaborator with Mr. Lethaby in an important book on "St. Sophia," which we only received two or three weeks ago, and which is still awaiting adequate notice in our columns. Mr. Swainson was only twenty-six. He had just gone to Egypt full of life and hope in hard work, and a sudden illness has ended his life. A friend describes him as one who, with great natural ability and quick insight, together with the simplest sensibility of purpose and the advantages of a university training, seemed singularly fitted to help forward the art of modern building to better issues. His letters show that his great delight in his travel was to observe how the Copts and Arabs still met structural requirements in a traditional manner, "both natural and national." One who has seen the book on St. Sophia, which was to a great extent his work, will recognise that in him modern architectural study has sustained a serious loss.

GENERAL BUILDING NEWS.

THE BUILDING TRADE IN MANCHESTER.—Perhaps there has been no trade more actively pursued in Manchester during the past year than the building trade. Throughout the city, structural alterations, additions, and renewals have been and are in progress, while in the suburbs a very large amount of work is being carried on in erecting villa and cottage property. Many hundreds of cottages, at rents varying from 5s. to 8s. weekly, are in progress, and houses of this class are rarely untenant. Rubion and some other special bricks have risen in price owing to the unusual demand, and so have some grades of stone. Timber, which is now more cheaply conveyed by means of the Ship Canal, has fallen. There is a growing tendency in the case of city property to employ girders instead of beams, as the saving in internal space is considerable. There is every promise of continued activity during 1895.

RESTORATION OF BRISTOL CATHEDRAL.—A meeting of the executive committee for the restoration of Bristol Cathedral was held on the 17th ult. in the Deanery. The sanction of the committee was given to raise the sum of 1,000l. as an initial outlay for laying down the foundations and framework of a new organ, the plan being to utilise all that was good in the present organ, and to make additions from time to time, as money came in. The question of lighting the choir then came under consideration. The architect having expressed his strong preference for lighting by pendants, rather than by standards or any other means, his proposal was agreed to, and it was left to the Chapter to decide whether gas or electricity should be employed. The question of heating the choir was postponed for

the present. The report of the clerk of works showed that three bays of the cloisters were approaching completion, and that the fourth would shortly be taken in hand. The redecking of the old oak stalls, and the laying of the marble pavement in the choir, were making satisfactory progress. Mr. Pearson's designs for a choir screen, reredos, sedilia, and side screens were then brought under notice. The estimates were as follows:—Choir screen, with gates, complete, 1,350l.; reredos (including sculpture valued at 550l.), 2,400l.; sedilia, &c., on north and south sides, wherein are re-used and incorporated portions of the old organ screen, 770l.; five wrought-iron side screens, 550l.

LEEDS BUILDING TRADES.—During the past twelve months the building trade in Leeds has not been of a particularly bright character. There have been no disputes of moment, but the undertakings which served as a redeeming feature of the back end of 1893 have been completed, and there have been comparatively none to take their place to give an improved tone to the year 1894. The work at the Post Office has been continued. It was expected at the close of last year that there would be a number of public improvements that would find work for the builders, but of these, the North-Eastern railway extensions, is the only one that has become a serious work. Building on a small scale has gone on in different parts of the city, especially in the Roundhay-road and Burley districts, but the employers of labour have had difficulty in finding work for all their regular hands, in spite of the favourable weather for outdoor work. The steps taken by the Corporation for the widening of a number of thoroughfares, and the some effect upon trade. The fire-clay industry in Leeds in its several branches has been fairly well maintained. There has been an increasing demand for glazed-bricks, while for other articles of sanitary ware there has been a steady trade.

BAINBRIDGE SHELTER, SHEFFIELD.—The building erected by Mr. Emerson Bainbridge at the corner of Norfolk-street and Surrey-street, Sheffield, for the benefit of unfortunate waifs and strays, was opened on the 28th ult. by the Duchess of Portland. The buildings have been erected from the designs of Mr. J. D. Webster. The ground-floor is occupied by shops. The first-floor, approached by a door in Norfolk-street, is set apart for the purposes of the shelter. The second floor is set apart for the purposes of the local branch of the Society for the Prevention of Cruelty to Children.

SHEFFIELD BUILDING TRADE.—The building trade of Sheffield has, during the past twelve months, been fairly active and prosperous. The main operations have been confined to house building, which has been carried on more extensively than in 1893, and chiefly in that portion of Sheffield which lies between Sharrow Vale and Abbeydale, where almost a new town has sprung up. The actual statistics of plans sanctioned by the authorities show that for dwelling-houses in the 12 months, 1,300 plans were passed, and about 350 plans for other buildings of various kinds. With the new Town Hall rapid progress has been made within the past few months. During the past twelve months the elevations facing Surrey and Norfolk-streets have been completed, and roofed in so that the City Surveyor's department may be able to remove as early as possible from their present offices in Bower Spring. The Council Chamber, and the ante-rooms connected, have also been roofed, the stone-work completed, and the general interior work very far advanced. The principal staircase leading to the Council Chamber and the Mayor's reception-rooms, has been finished so far as regards the exterior work, and the oak lantern-light has been hung. A start has been made on the carved panels and spandrels, and the polished marble lining which is to embellish the lower portion of the staircase is being prepared. Steady work has been done on the elevation in Pinstone-street, which includes reception-rooms and the corridors leading to the same. The roof-timbers are partly in position, and with the exception of the gables, the stone-work is virtually finished. The tower which is to ornament the structure is just now emerging over the adjacent roofs. The greater portion of the carving and figures are already completed, and have been exhibited by Mr. Pomeroy, the sculptor. While the number of men employed by the contractor has seldom been less than 200, it is a year no accident of a fatal character occurred, nor has any other serious accident happened during the construction of the building.

STABLES, KILMARNOCK, AYRSHIRE.—The new Corporation stables in Titchfield-street, Kilmarnock, were opened on the 21st ult. The site embraces the ground behind Calcutta Lodge, extending to about 100 ft. by 160 ft., and the buildings are erected on three sides, leaving a courtyard in the centre. The plans were prepared by Mr. R. S. Ingram, and the principal contractor was Mr. James Walker.

SCHOOLS, GREAT BENTLEY, ESSEX.—The Great Bentley School Board have appointed Mr. J. W. Stuart, F.S.A., of Colchester and Harwich, as their architect, for the new schools to accommodate 250 children, with the necessary offices, playgrounds, &c., about to be erected near the railway station.

BUILDING, STONE, AND TIMBER TRADES OF BRAINFORD.—Comparatively little building has been

dene in Bradford during the past year. With the exception of the Prudential Assurance Company's new offices and the Midland Railway Company's Goods Offices, no business premises of any note have been erected during the year. Extensions, however, have been made to the Usher-street and Belle Vue Board Schools, and a large Board school is in progress at Frizinghall. Labour has been plentiful during the year, and labourers' wages have been advanced $\frac{1}{4}$ d. an hour. The stone trade has only been moderate throughout the year, greater dullness perhaps prevailing during the closing months. Prices of stone rule about the same as last year. The timber trade has not experienced any remarkable change during the year. Trade has not been brisk in any department.

BUILDING IN EDINBURGH AND LEITH IN 1894.—During the past year building operations in Edinburgh have exceeded in number those of the previous year or two. Perhaps the outstanding features of the work done have been the completion of big undertakings on the one hand, and the amount of tenement building on the other. The building trade at Leith during the past year has been well maintained. Several important erections have been completed, and others are at present in course of construction.

BUILDINGS OF THE SUN INSURANCE OFFICE, GLASGOW.—New buildings have been erected in Cathedral-street and West George-street, Glasgow, for the Sun Fire and Life Insurance Office. The buildings were designed by Mr. Wm. Leiper, architect, Glasgow. The frontages to both streets bear a considerable amount of sculpture, executed by Mr. William Rhind, Edinburgh. The capitals of the street floor are emblematical of the signs of the Zodiac, and surmounting the pediment is a kneeling figure of Apollo. Above the pediment is a pediment of Apollo and another of Day and Night. The treatment of the upper stories follows that of the Chateaux of France, with enriched dormers. The main entrance is in the angle, and forms the basement of a large octagon, which is crowned by a domical roof and lantern. At the base of the dome the circular pediment is filled with sculpture representing Aurora. Above the doorway are sculptured panels of winged figures holding the shields of England, Scotland, and Ireland. The whole building is of red freestone, with a base of red Corrennie granite, and the roofs are covered with green Elter Water slates. Altogether, the building consists of six floors and a basement. An installation of electric light has been fitted up, the current being supplied by the Corporation, and an electric hoist gives access to the upper floors.

SANITARY AND ENGINEERING NEWS.

SEWERAGE WORKS, RHYL.—On the 14th ult. memorial stones were laid at Rhyll of the new sewerage works and marine lake, which are now in course of construction at a cost of 50,000*l.* The sewage will be conveyed by gravitation to a large reservoir, and lifted by machinery to a high level and discharged into the sea at a long distance from the shore, the old tide-lock system being entirely dispensed with. The marine lake will cover forty acres, have an island in the middle, and a drive right round. Mr. Baldwin Latham is the engineer.

SEWERS AND STREET-WORKS, HENDON.—Colonel Coke, C.E., President of the Inspectors of the Local Government Board, held an inquiry at the office of the Board, Hendon, on the 21st ult., with reference to an application of the Local Board for permission to borrow a further sum of 5,307*l.* for works of sewerage, and 3,353*l.* for private (street) works and improvements. Mr. S. S. Grimley, engineer to the Board, explained the various plans and there was no opposition. The inspector subsequently visited the several localities accompanied by the engineer, including the outfall works, where the sewage is treated by the International Water and Sewage Purification Company, also the pumping main sewer in course of construction, and promised to report as soon as possible.

WATER SUPPLY, LYNN.—The Lynn Town Council having received and seven acres of arable land in the parish of Gayton, for the purpose of their new water supply, the contract for sinking two trial wells through the chalk has been entrusted to Mr. W. S. Freeman, of Oxford, Kent. The site is 1,000 yds. from Well Hall Farm, and 500 from Gayton Union Workhouse. The wells are to be 14 ft. apart (except to centre), each 7 ft. in diameter, and about 10 ft. deep, with ditches or galleries (running parallel north and south) of considerable size, cut into the chalk until what is considered a sufficient supply of water is met with, and the excavating operations are expected to be completed in three months. The water is to be tested by a Local Board of Government, and upon his decision rests the ultimate issue whether or not the scheme of the Borough Engineer, Mr. E. J. Silcock, shall be further proceeded with. Already 75-in. pipes have been laid by Mr. H. Collison, of Lynn, from the river, part of the way up the lane next the field in question; they are to be continued to the wells, a total distance of 1,000 yds. and will be used for clearing off the water pumped therefrom, and are intended for a portion of the permanent scheme.

MISCELLANEOUS.

INFORMATION FOR EMIGRANTS.—The January circulars of the Emigrants' Information Office show the present prospects of emigration. A summary of Consular reports from the United States and other parts of North and South America is also issued for the fourth year. In New South Wales there is no demand for more labour, except for domestic servants; in some of the coal-mines have been closed owing to the depression, and wages have been reduced in the printing and other trades; the railways, however, have been doing well. In Victoria the metal, building, and other trades are amply supplied with labour; the furniture trade continues very depressed. South Australia and Tasmania are fully supplied with all kinds of labour. The prospects in the building trades of Brisbane are better than they were, but there is no opening for more hands. Work in New Zealand has with the return of spring become much more plentiful, and there is a large decrease in the number of men travelling on the road; with the exception of Western Australia, it is the only colony which offers a fair opening to mechanics and other skilled workmen at the present time. The system of opening up the Crown lands in New Zealand, and letting them in areas of from 50 to 200 acres to working men, the Government paying for felling the bush and adding the cost to the price of the land, has been a marked success. Nominated passages to Cape Colony have not been withdrawn from mechanics and artisans; men are warned against emigrating to the Cape, unless they have secured employment beforehand. In Natal there has been a fair demand for a few bricklayers and plasterers at Durban, but otherwise the colony seems well supplied with mechanics. Emigrants to that colony should remember that the ordinary trades, such as those of brickmakers, navies, &c., are to some extent in the hands of Indian coolies or of coloured natives working for low wages.

THE SANITARY INSTITUTE.—At an examination for Inspectors of Nuisances, held at Liverpool on the 21st and 22nd ult., sixty-seven candidates presented themselves. Questions were set to be answered in writing on the 21st, and the candidates were examined *visu et voce* on the 22nd. The following thirty candidates were certified as regards their sanitary knowledge, competent to discharge the duties of sanitary inspectors:—Thomas Catterall, Blackburn; Helen George Coache, King's Heath Vicarage, near Birmingham; Robert Collins, Manchester; Joseph Henry Cowden, Walton, Liverpool; Ethel Deane, Sefton Park, Liverpool; Philip James Ducker, Chester; James Eastwood, Mytholmroyd; Thomas Armistead Foxcroft, Settle, Yorkshire; John Singleton Green, Haslingden; Richard Harrison, Liverpool; Dudley Hickman, Altrincham, Cheshire; James Hulst, Tyldesley; Mildred M. Jones, Birkenhead; Francis Lancaster, Barnoldswick; Alexander Love, Trarua, Birkenhead; Robert Lowe, St. Helens; Eugene Albanus Lowe, Liverpool; William Lyon, Walton, Liverpool; Richard Price Morgan, Towyn, North Wales; Edwin James Pamphill, Hulme, Manchester; John William Parker, Burslem; Henry S. Phillips, Ennis, Co. Wick, Ireland; Joseph Robson Sykes, Thornaby-on-Tees; David Walker, Liverpool; Thomas Henry Whitte, Ramsbottom; John Wilson, Manningham, Bradford; John Younger, Birkenhead.

THE PLUMBERS' COMPANY.—The Lord Mayor on Saturday last distributed the medals, silver and bronze, certificates, first and second class, to the students who have most distinguished themselves during the recent examination connected with the classes of the Plumbers' Company, the Master of the Company, Sir Stuart Knill, presiding. At the meeting, which took place at Guildhall, the following ten operative plumbers, who had passed in honours, were presented by Sir Stuart Knill with the freedom of the Company to mark the appreciation of the honour done to the craft by the honourable position they had attained in the examination lists. The successful students were Timothy Bradshaw, Pendlebury (Lancs.); Thomas Croft, Salsbridge; Michael Fennell, Dublin; William Firth, London; J. W. Holbrook, Bristol; Mark Kershaw, Manchester; Ch. V. W. Quash, London; Hy. Bowden Serridge, Plymouth; Arthur W. Walter, London, and Jno. Webster, Glasgow. The medals, from a design by Mr. W. D. Caröe, executed by A. Wyon, first struck for the National Workmen's Exhibition, were presented the silver medal to J. Parrett, W. T. Sheppard, and A. V. Walter, all of London; the bronze medal to R. Sanderson, Preston; H. Beeson, London; J. J. G. Turner, London; and three youths belonging to Leeds, Messrs. Whitwell, Sanderson, and Lewis. The following received certificates—C. Jeffrey, W. C. Greenland, and S. R. Roberts, London; and E. Bedford, F. Royce, J. C. Rossall, E. Hamsley, and J. Wooler, Leeds. In the course of the proceedings, Professor Garnett in a brief address said, the Plumbers' Company had been at great pains to provide workshop teaching in their classes in order to ensure that the teaching should have the most practicable character attainable. It was a strict

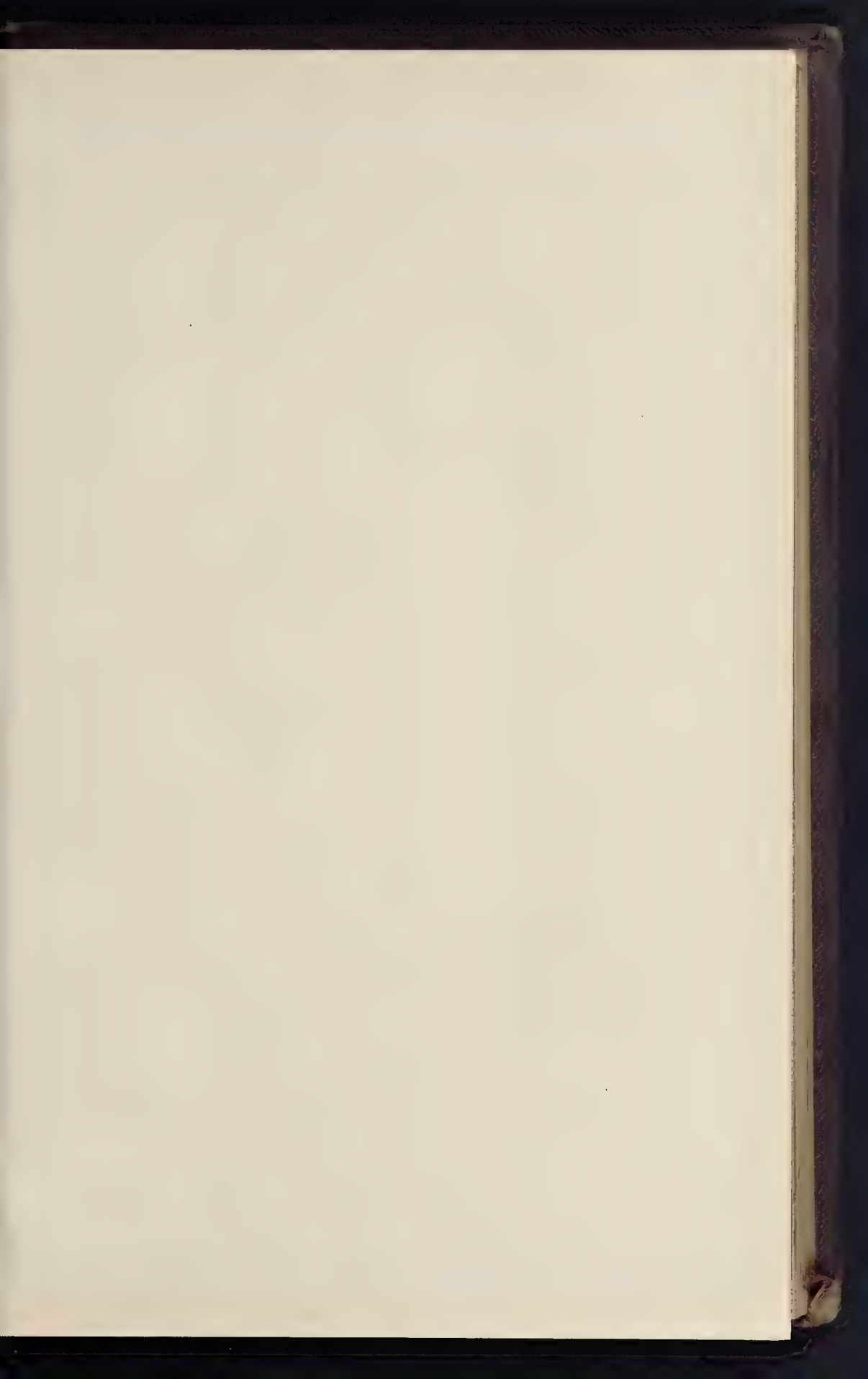
condition that all students should be members of the trade, and the public had thus the best guarantees of the practical value of the technical education given by the Company. The syllabus had been much criticised. By some it was considered too theoretical and insufficiently practical, but he thought any practical shortcomings that might have existed would be generally found to be due to the too theoretical character of the syllabus, but to some want on the part of certain teachers, of such a complete mastery of the subject as would enable them to reduce their theoretic and scientific knowledge to those practical lines, which were an absolute necessity in all technical teaching of this kind.

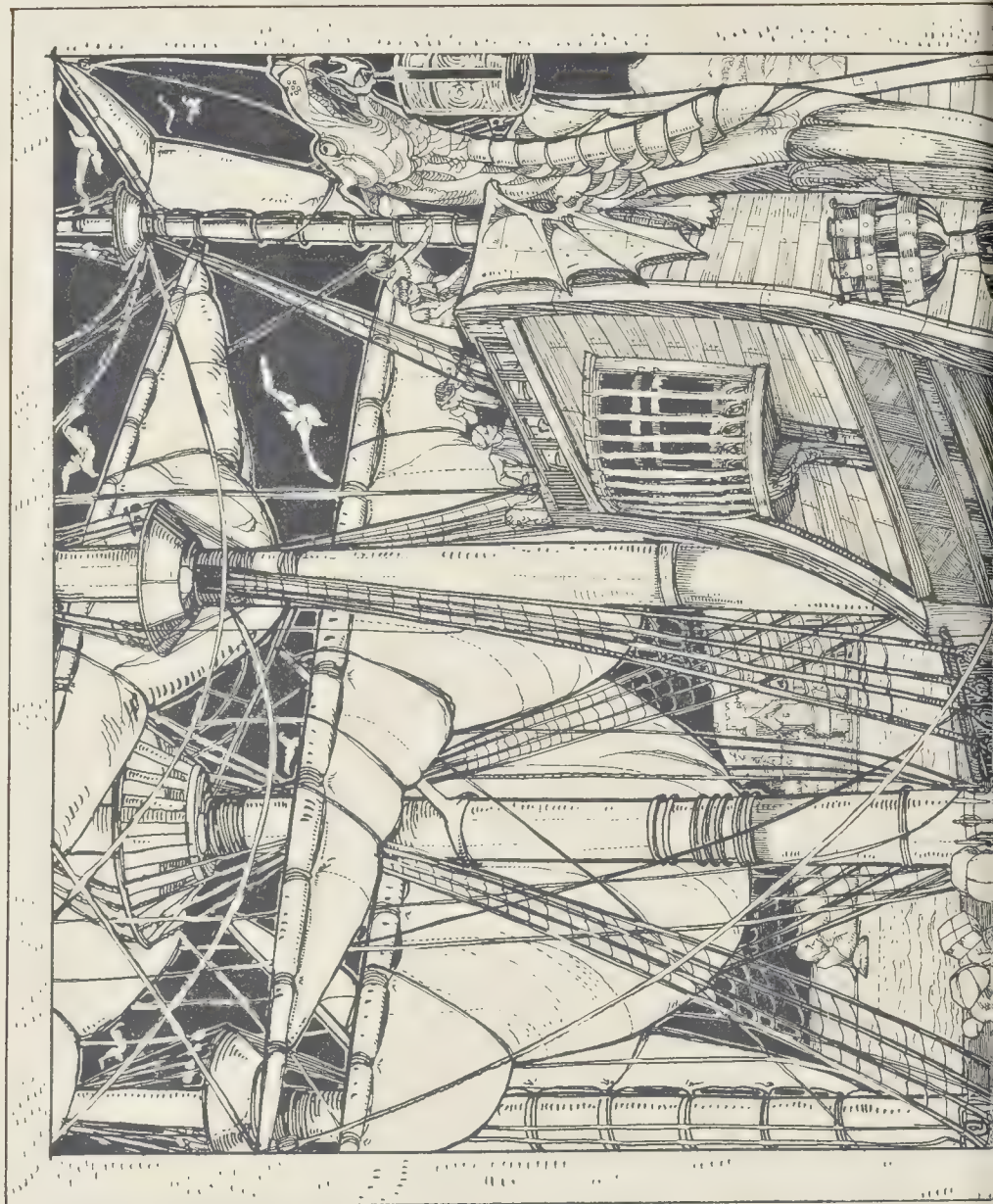
PUBLIC IMPROVEMENTS IN SHEFFIELD.—Mr. C. F. Wike, the City Surveyor of Sheffield, has forwarded us some facts and figures in relation to the Sheffield High-street improvements and other works. The High-street improvement will cost over a quarter of a million of money, and it is already progressing with some rapidity. The whole of the footpaths have been purchased or arranged for; but there are still several leases to be got in. About a year ago the great fire at Messrs. Hovey's gave the Corporation an opportunity of securing the widening of Castle-street and Angel-street. Since that occurrence, a building-line has been arranged with the property-owners, which gives a 50-ft. street. Three properties have already been secured. Negotiations are still pending in regard to Conyngsley-frontage. The improvement will give a 50-ft. width right up to King-street, and the cost is estimated at over 50,000*l.* These are two of the largest schemes the Corporation have been engaged in during the year; but there are some fifty or sixty smaller improvements in different parts of the city, which irregular building in former years and faulty street-lines have rendered necessary. The most notable of these smaller improvements is that at Eyre-street, which gives a long-desired through-street in what was formerly a puzzling and perplexing way. Considerable progress has also been made in regard to the widening of Westbar, and it will not be long before the full width of 60 ft. will be secured for full length. The work of street dedication has been proceeding rapidly during the past year. The necessary plans and notices have been prepared and issued for about three miles of this street work. About five miles of streets have been reconstructed in different parts of the city. Fargate, Division-street, West-street, Westbar, and other thoroughfares to the extent of 2½ miles have been paved with wood-blocks, granite, or re-macadamised, and about 6½ miles of footpaths have been relaid. During the year nearly seven miles of new sewers have been constructed in different parts of the city at a cost of over 25,000*l.* This includes about three-quarters of a mile of main sewers at Walkley, and about 2½ miles along Abbeydale-road. The water-carrying scheme has also necessitated the construction of another three-quarters of a mile of sewers on highways which have been taken over by the Corporation. At the Sewage Works at Blackburn Meadows the great difficulty which existed in getting rid of the vast accumulation of sludge has at last been overcome. The Corporation have secured a number of railway waggons for this purpose, and during the last twelve months have removed over 50,000 tons.

LONDON WATER SUPPLY.—In the recently-issued report of the Water Examiner for London, it is stated that during the course of last month 182 samples were tested, of which sixteen were recorded as being "clear but dull," and only one as being "slightly turbid." The floods last month in the Thames Valley have been the most severe since the year 1827. During November the average rainfall at Oxford is estimated at 2'3 in., but last month the actual rain amounted to no less than 4'8 in., being an excess of 2'49 in. There was one striking peculiarity connected with last month's rainfall. In most exceptionally wet seasons the fall of rain is more or less evenly distributed over the month. Last month there were seventeen days on which no rain fell and eight other days on each of which less than two-tenths fell. On the remaining five days—the 7th, 11th, 12th, 13th, and 14th—no less than 4'02 in. fell, and since the 14th the fall has not exceeded 0'17 in. The sudden downpour of 4 in. of rain in five days amounting to over sixty-nine million gallons per square mile, largely overtaxed the capacity of the river to carry it off, whereas had this amount been more evenly distributed over two or three weeks no harm would have been done. Bacteriological examinations of the waters were conducted unremittingly during the month, for it was important to ascertain how the filter-beds were working under the unprecedented strain to which they were subjected. Samples taken from the filter-beds and also from the mains showed, on examination, that the water, as sent out for consumption, was, from a bacteriological point of view, a pure article. In several instances the colour was higher than usual, but the entire absence of ammonia and the high ratio between organic carbon and nitrogen proved that the colouring matter was entirely of vegetable or peaty origin.

MATHESON & GRANT'S ENGINEERING TRADES' REPORT.—Messrs. Matheson & Grant, in their usual half-yearly report, state that during the half-year there has been an almost dead level of low prices and monotonous depression, for the bottom was reached some months ago, and hardly any

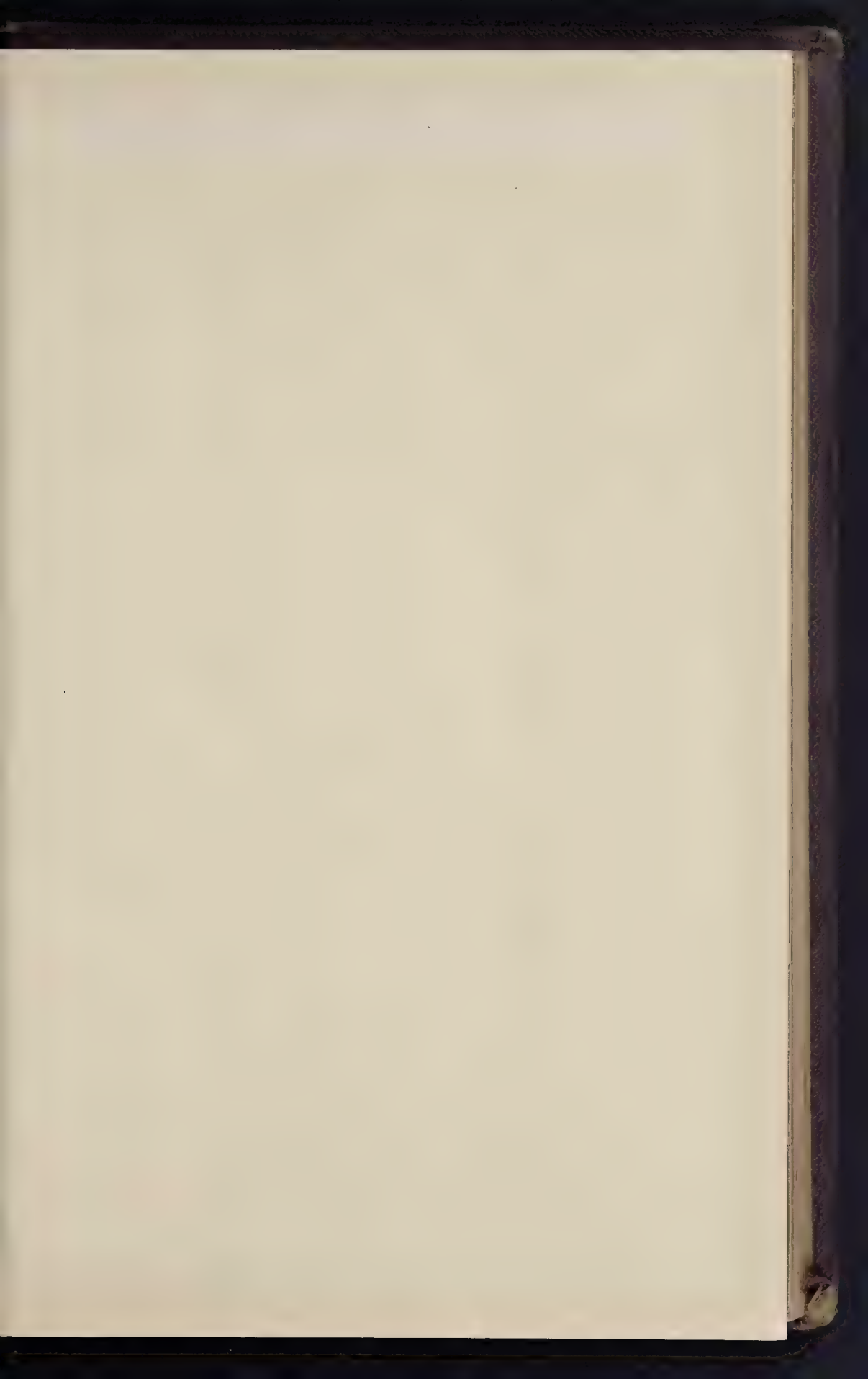
Liverpool Engineering Society.—Mr. John A. Brod on "Tramway Traction." 8 p.m.







SIR CAUCHELOT TOOK SHIP AND WENT OVER TO FRANCE





THE LIVERIE KITCHEN

CLOCK TOWER

GREAT HALL

WITHDRAWING ROOM

THE CASTLED TOWER

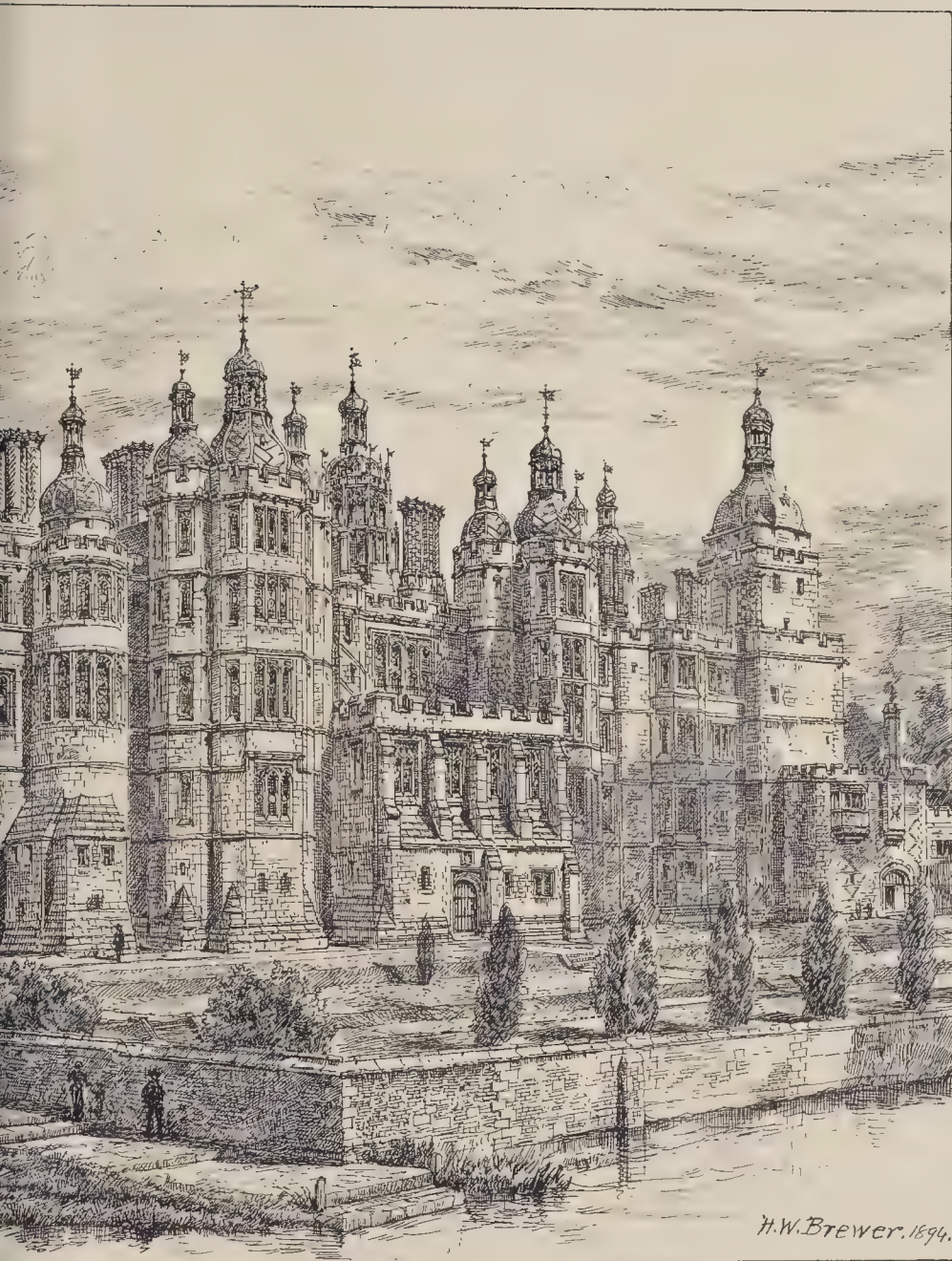


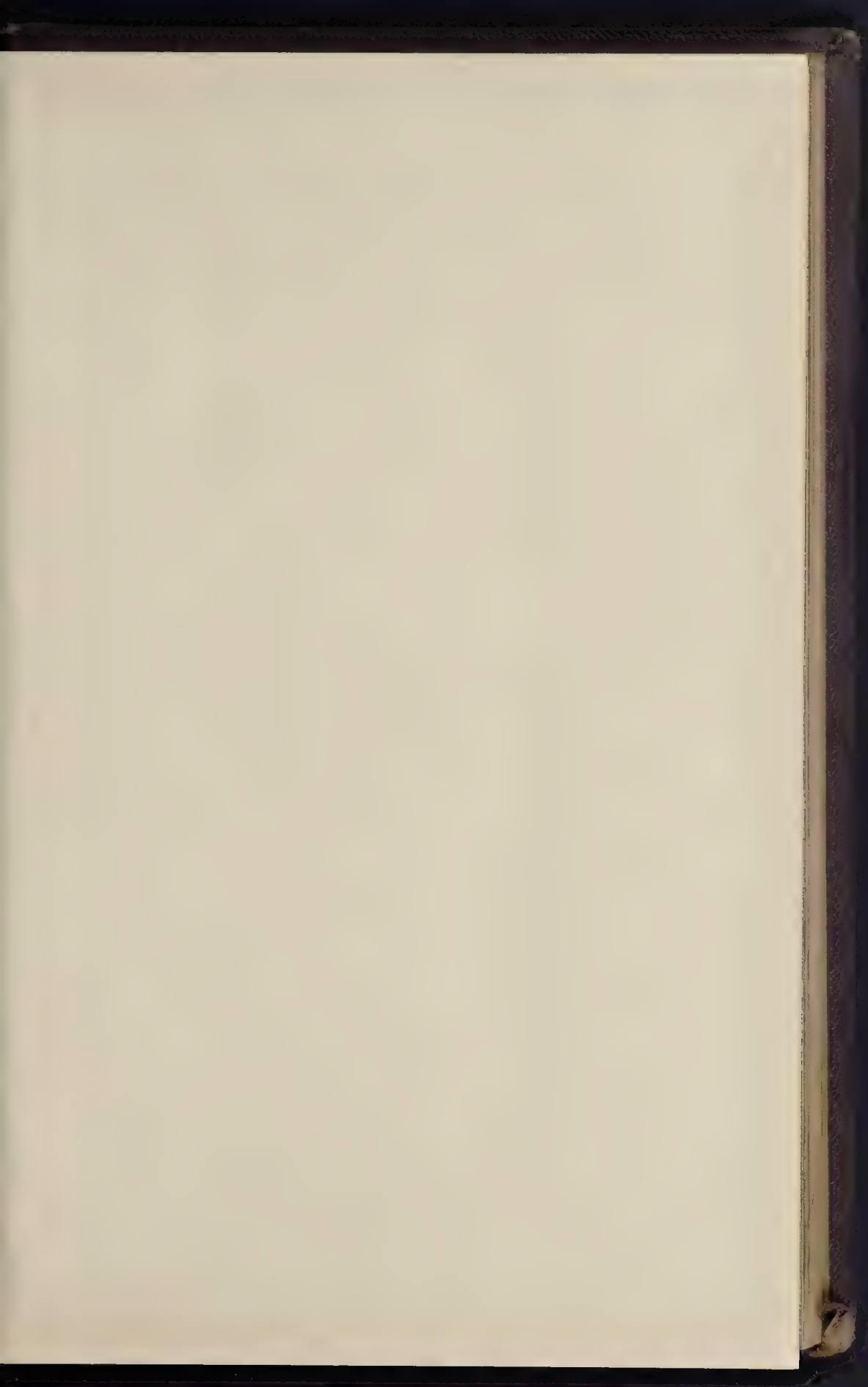
PHOTO. LITHO. SPRACLE & CO. 4 & 5 EAST HARDING STREET, LUTTER, LANE EC

THE PRIVY APARTMENTS

" THE LANTHORN "

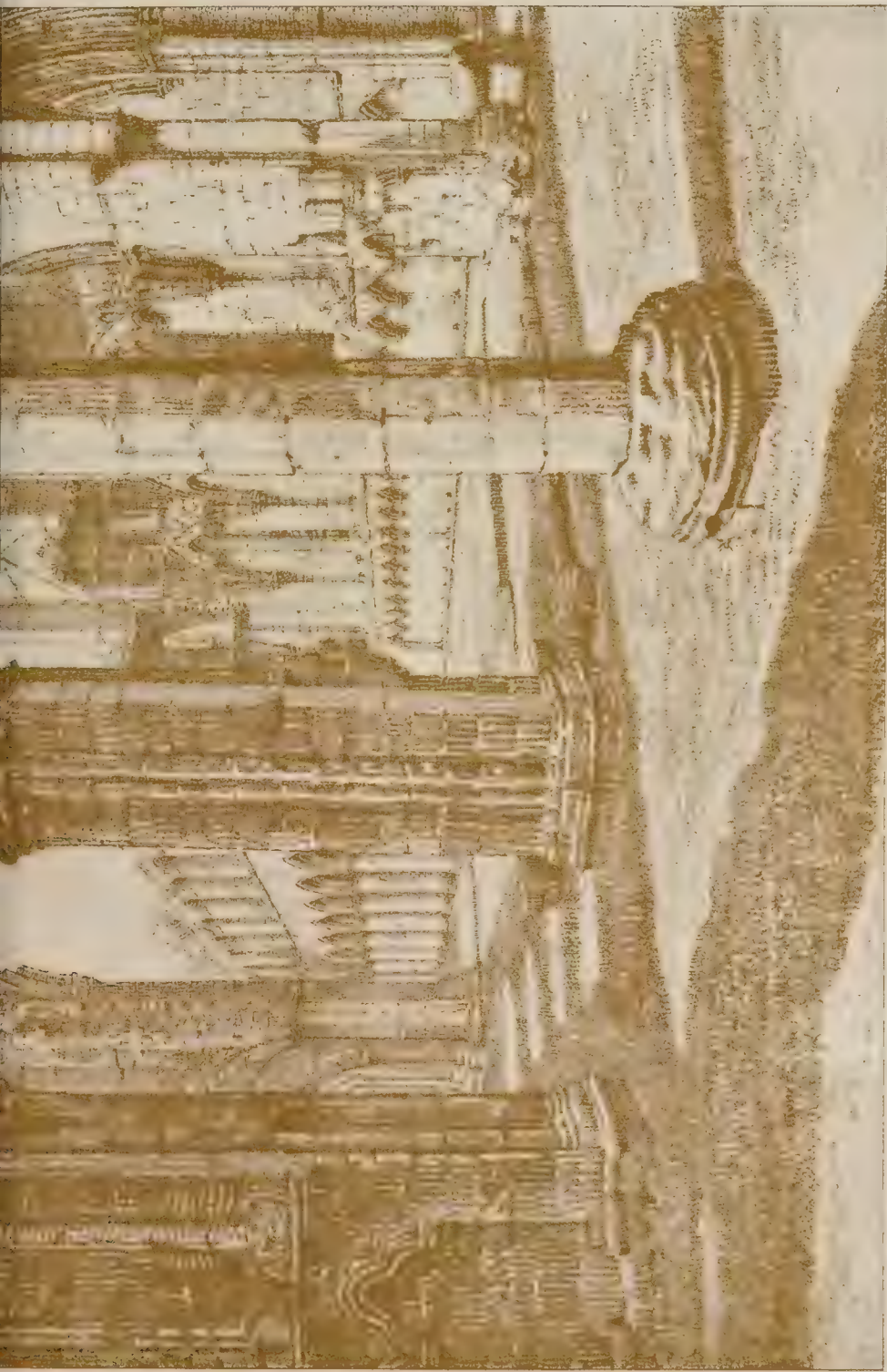
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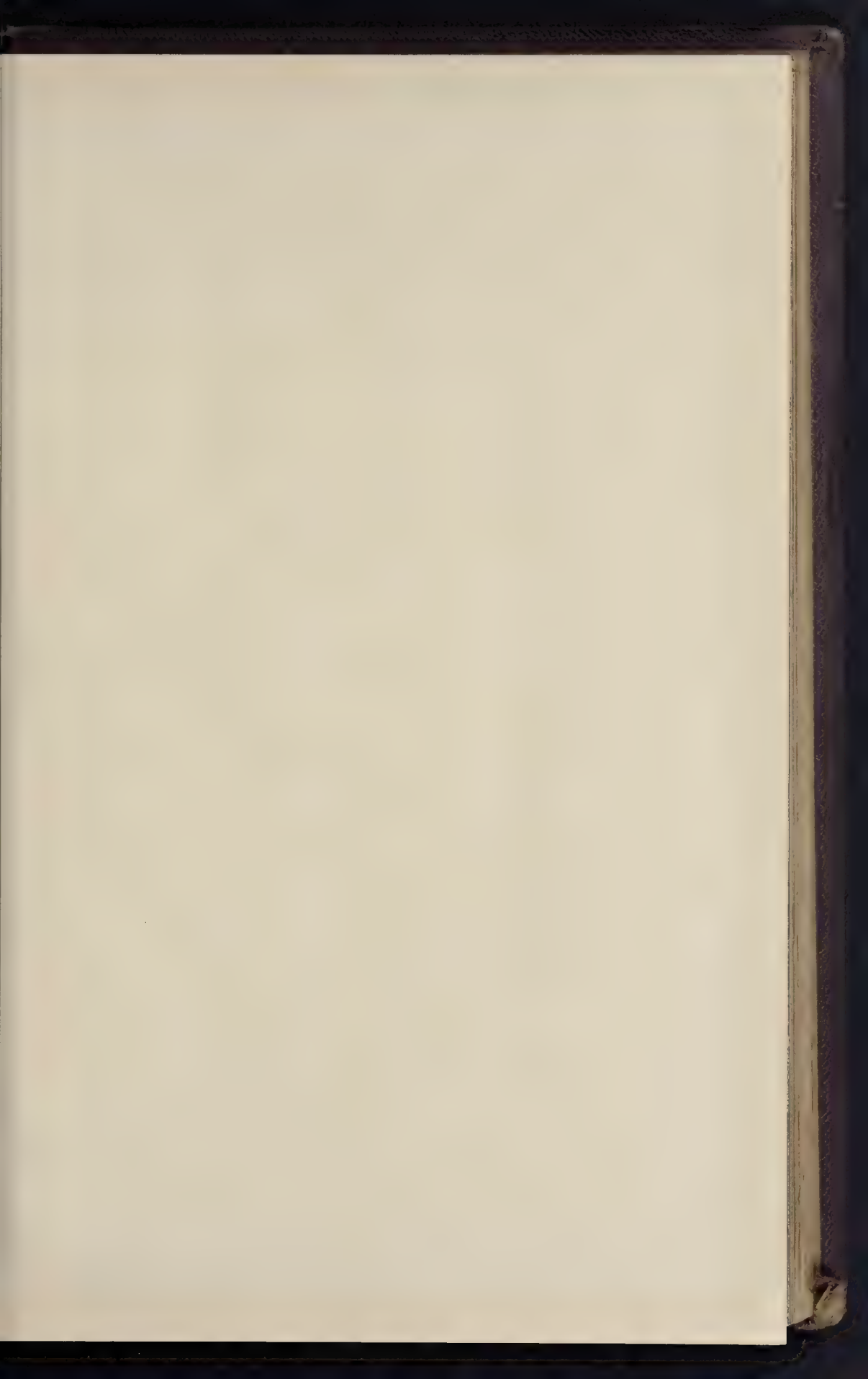
THE BUILDER JANUARY 3, 1925





THE ABBEYS OF GREAT BRITAIN.—No. 8. FOUNTAINS.

DRAWN BY MR J. A. SLATER



FOUNTAINS ABBEY.

GENERAL PLAN.

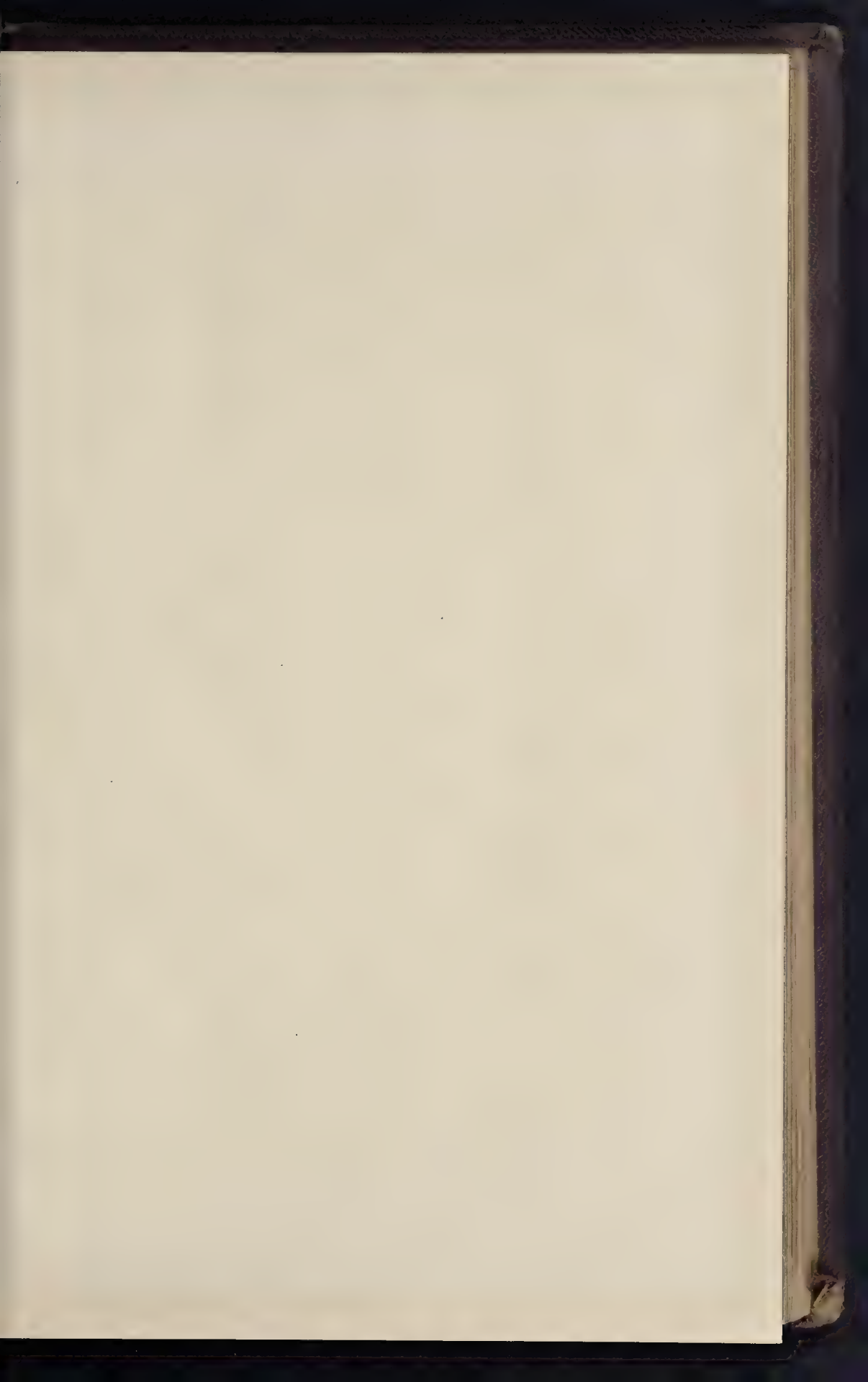
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SCALE OF FEET





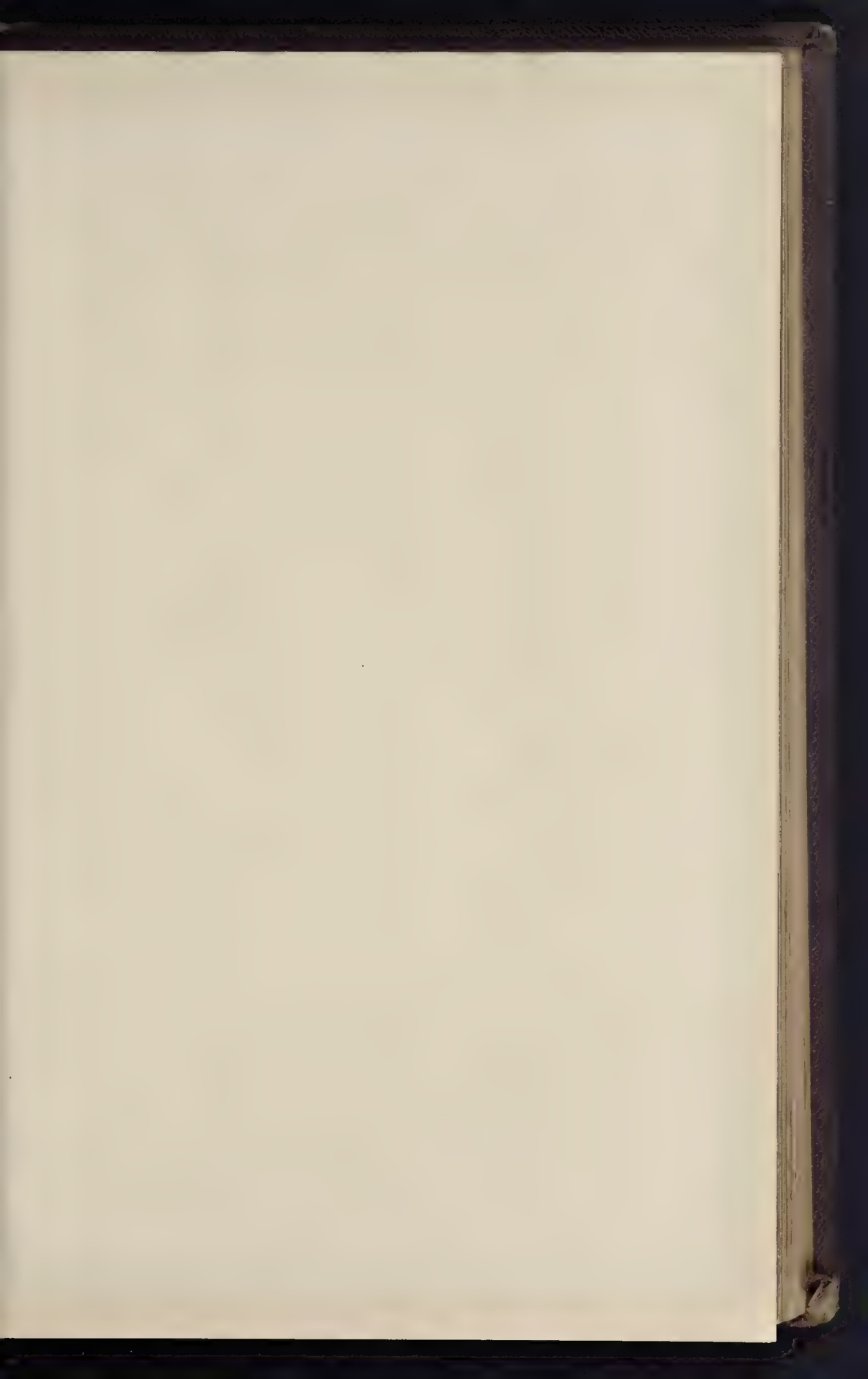
PHOTO 1 THE SPRAY UP & CP AKA'S FAST HARD NO STREET CENTER AND L'

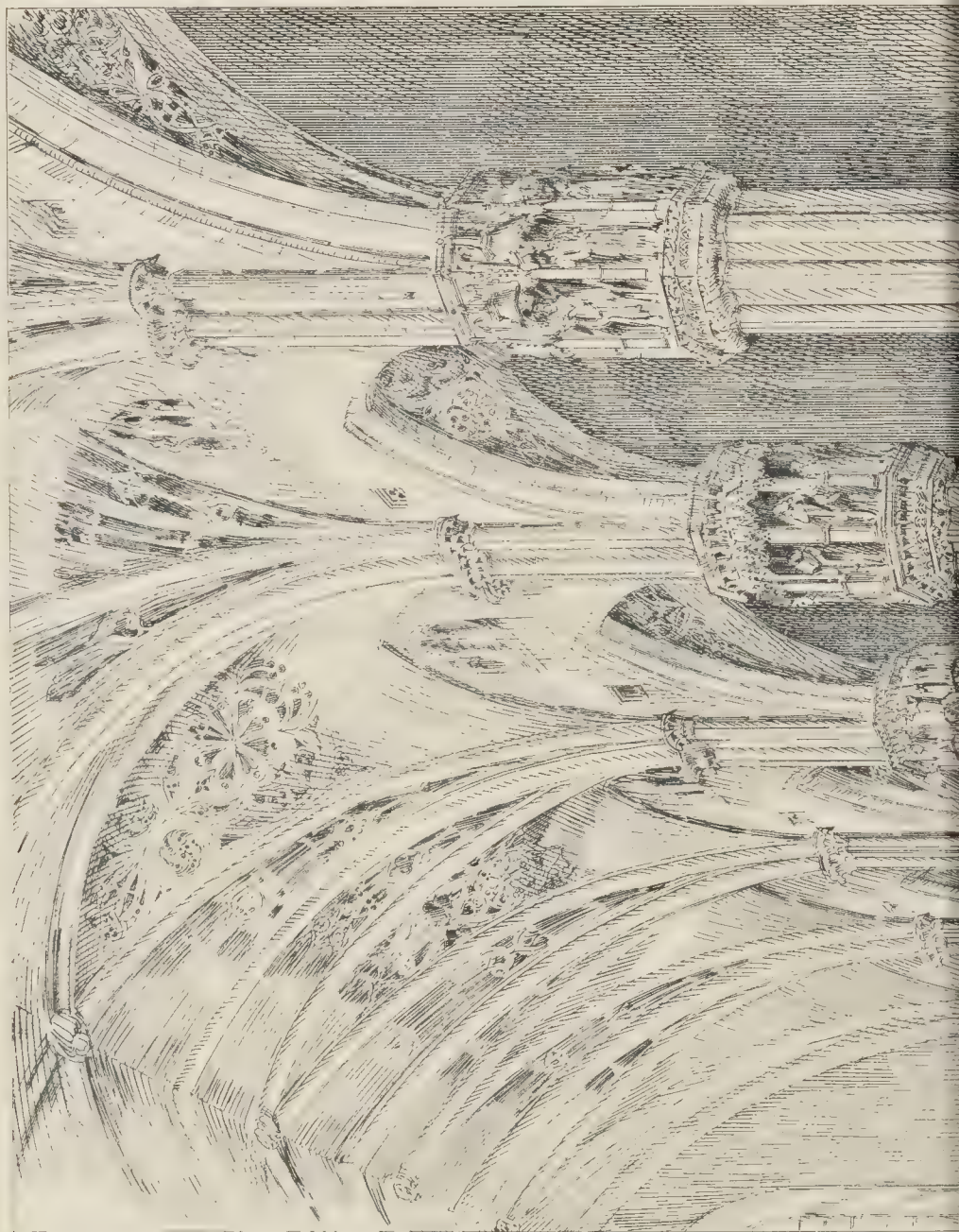


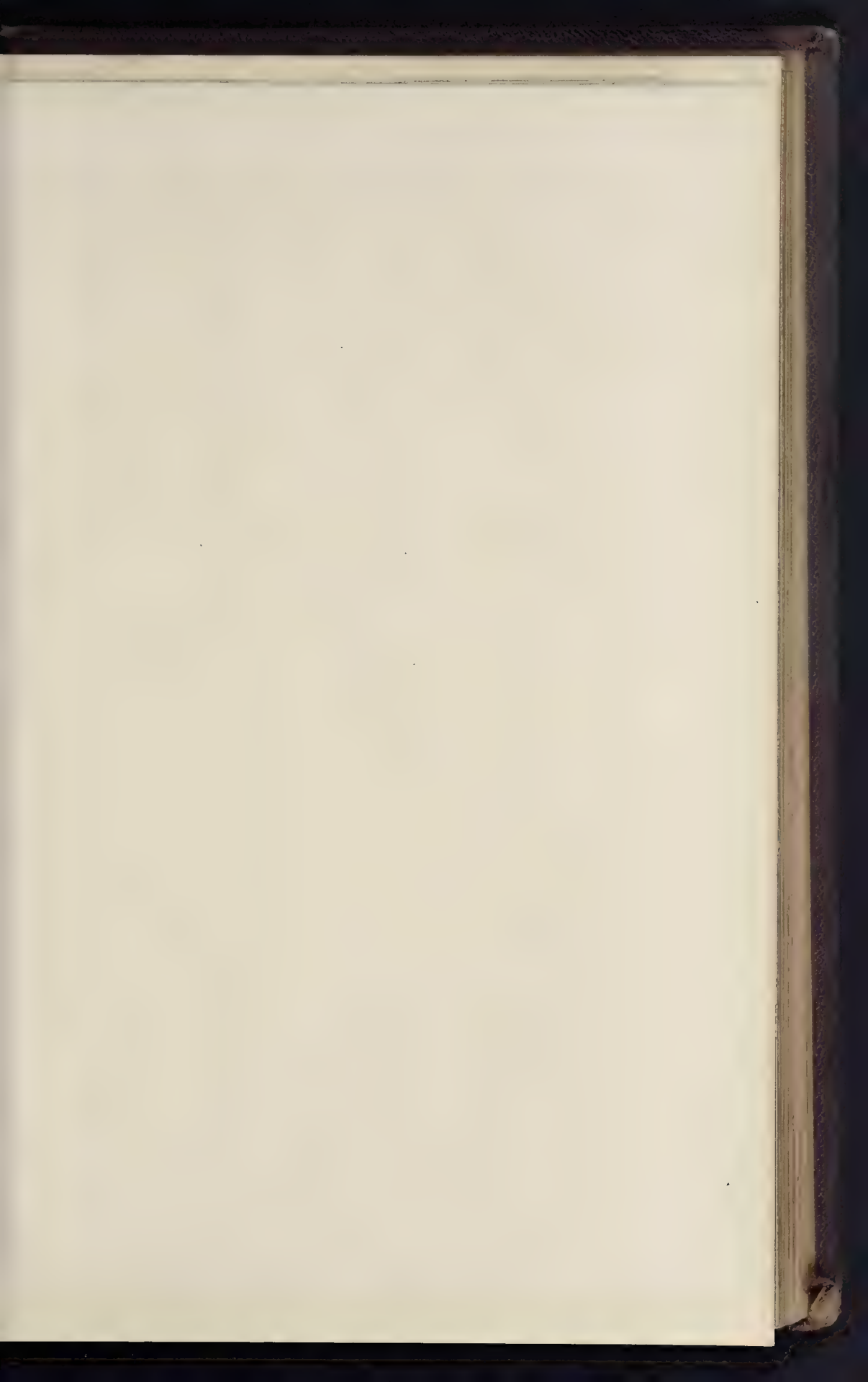


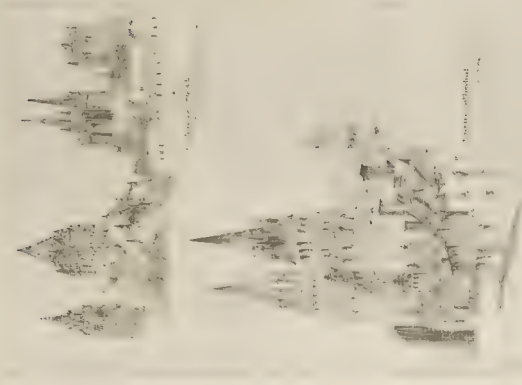
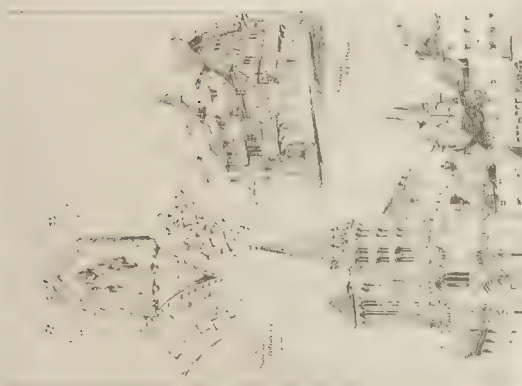


WHITBY ABBEY —FROM A DRAWING BY MR. J. A. SLATER.



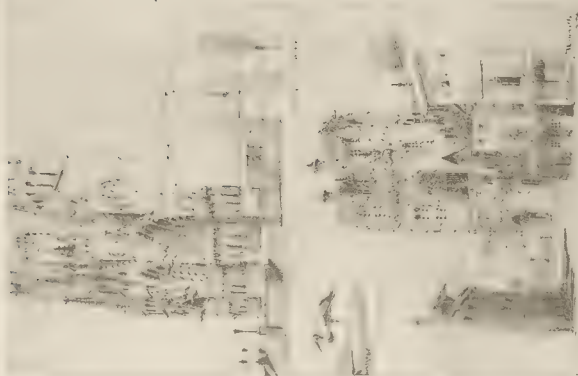








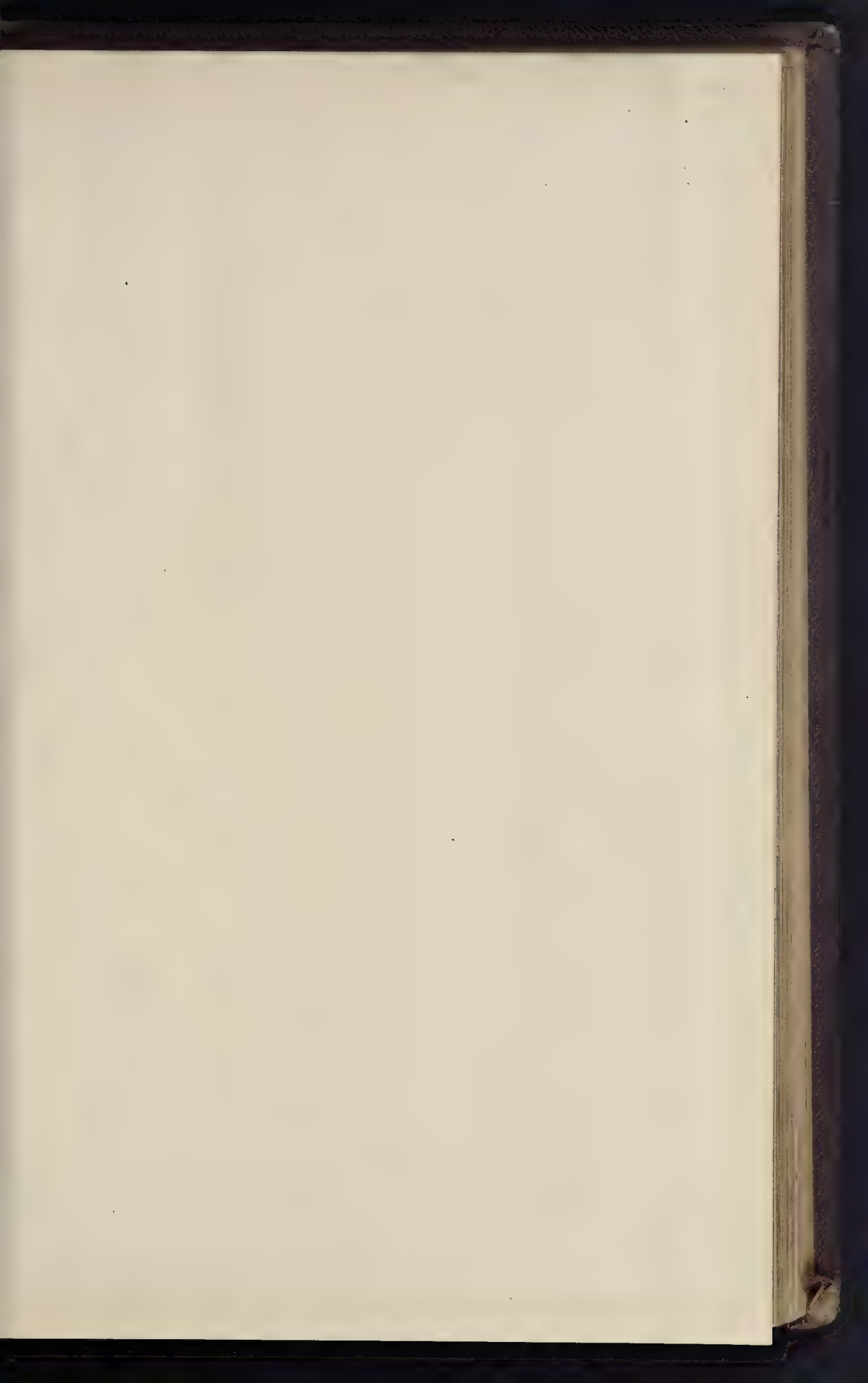
A sketch of a landscape

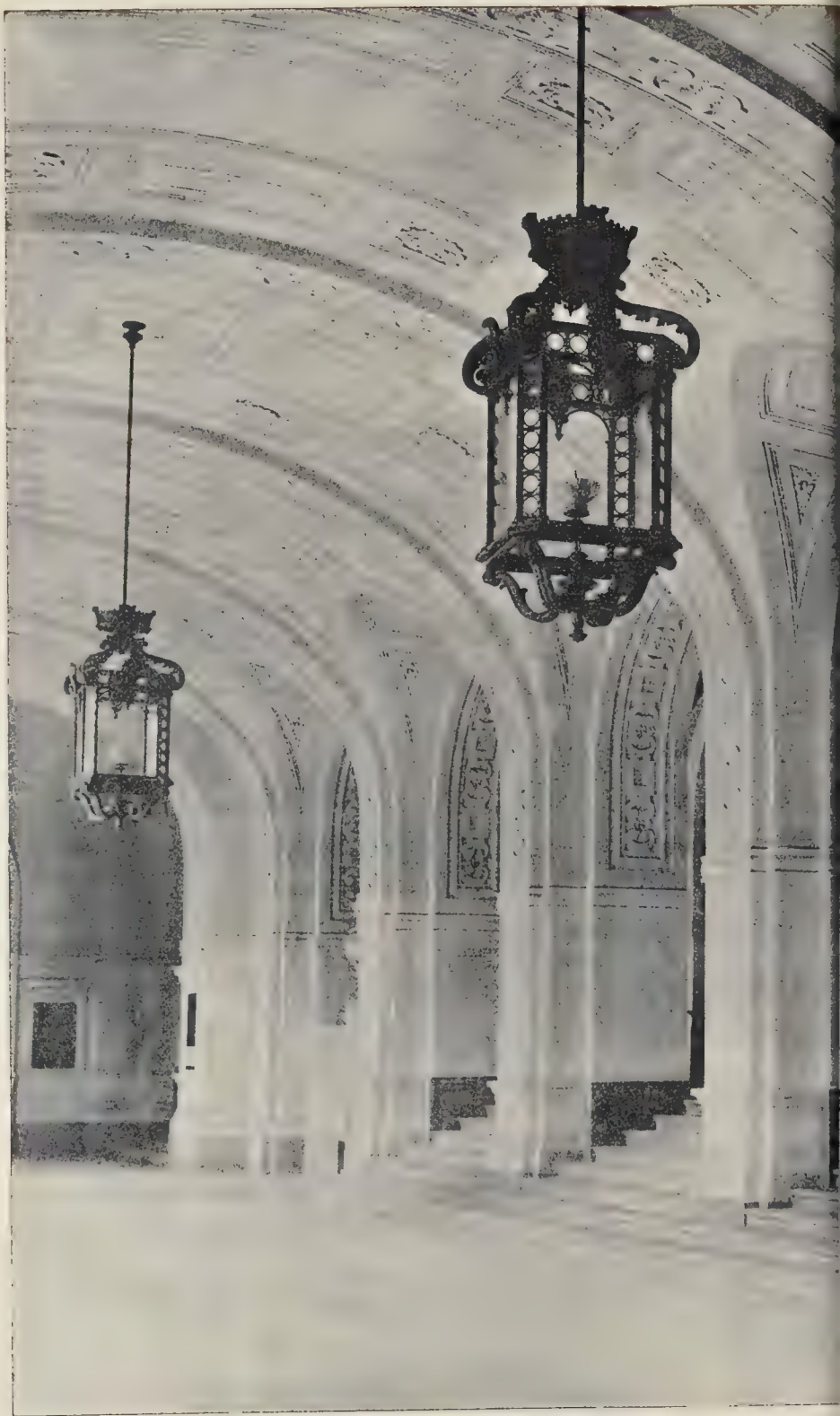


A sketch of a landscape



A sketch of a landscape



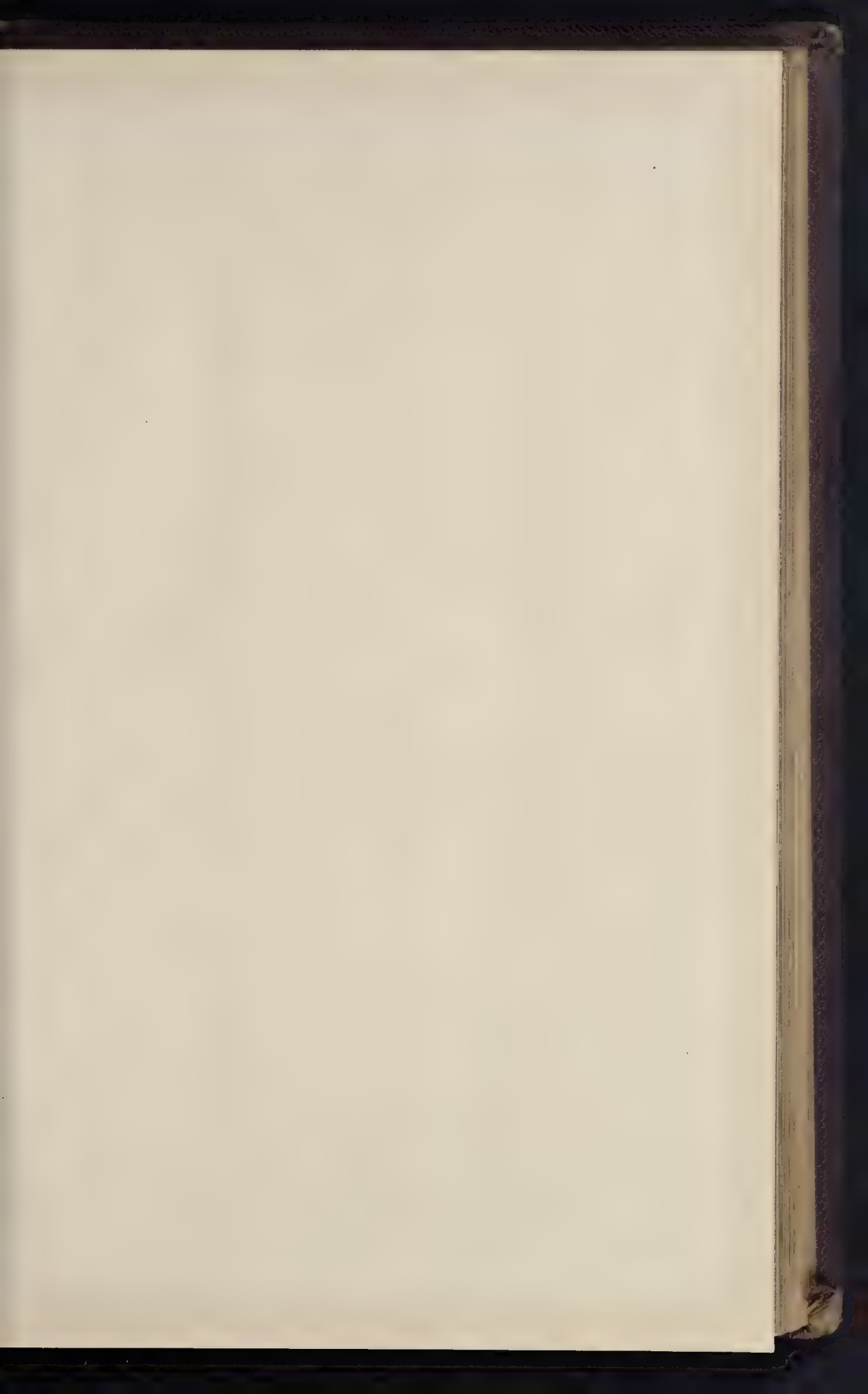


THE NEW SORBONNE
VESTIBULE OF



NENOL, ARCHITECT
TAIRCASE.

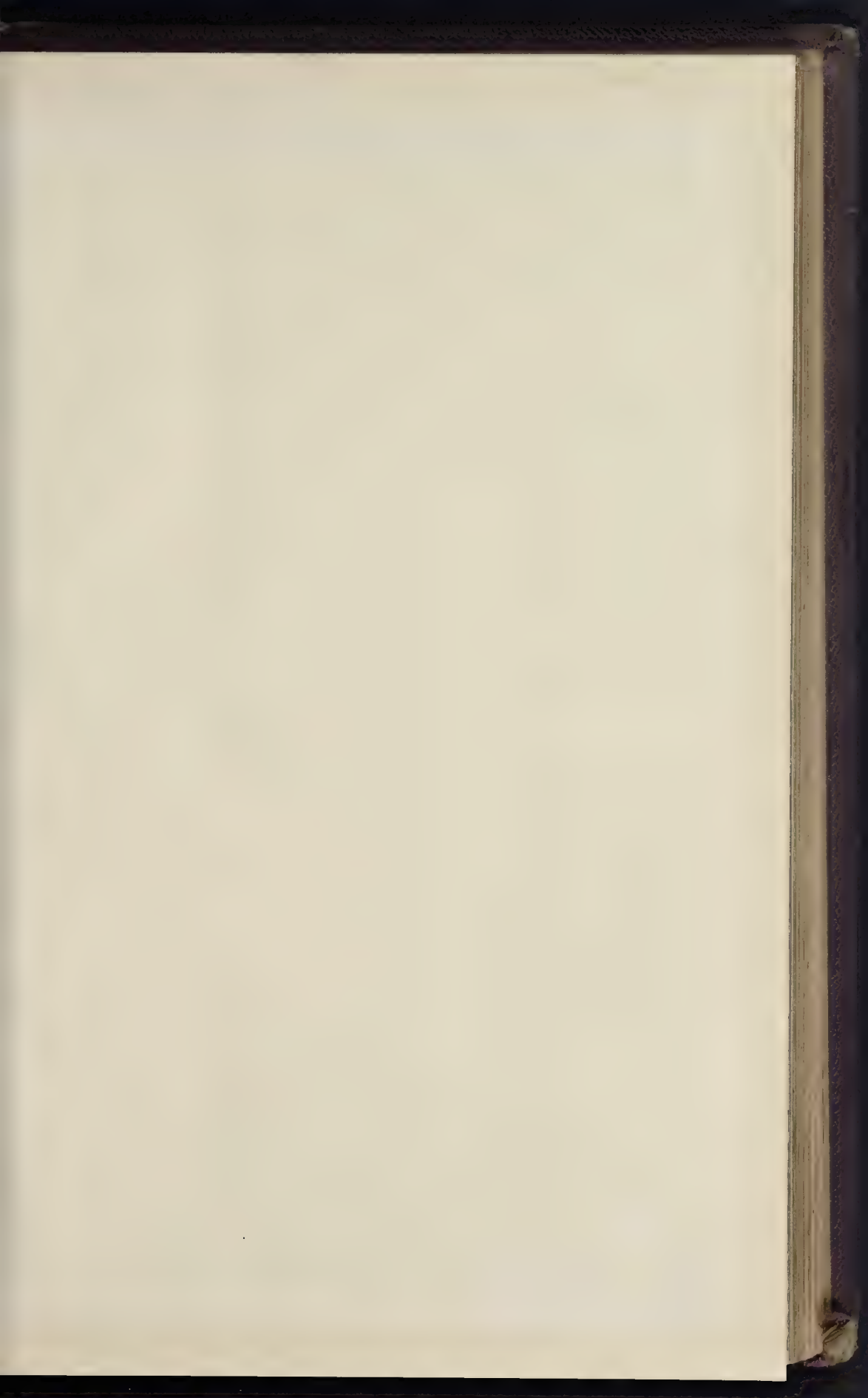
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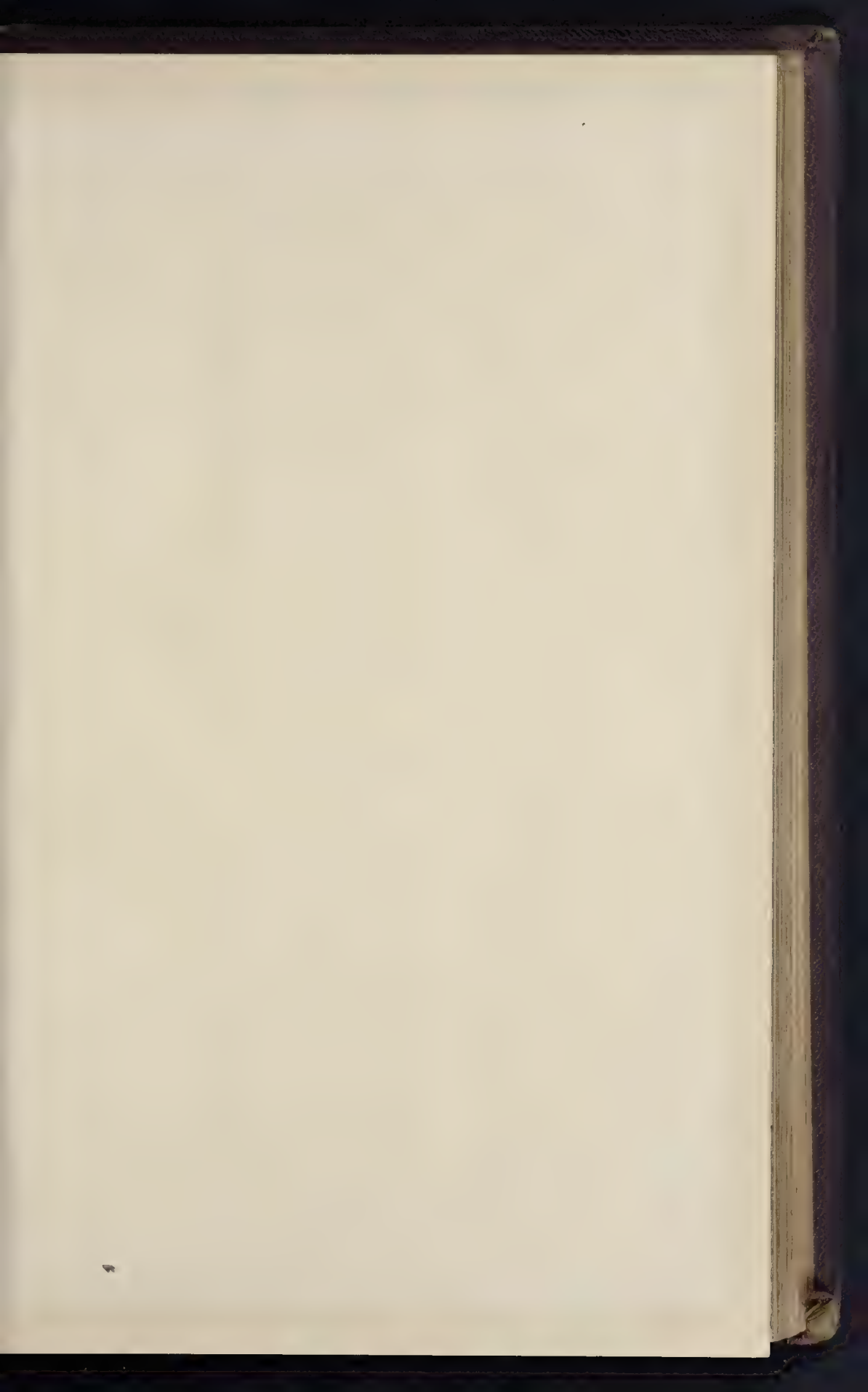
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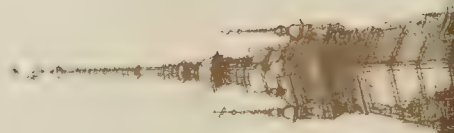


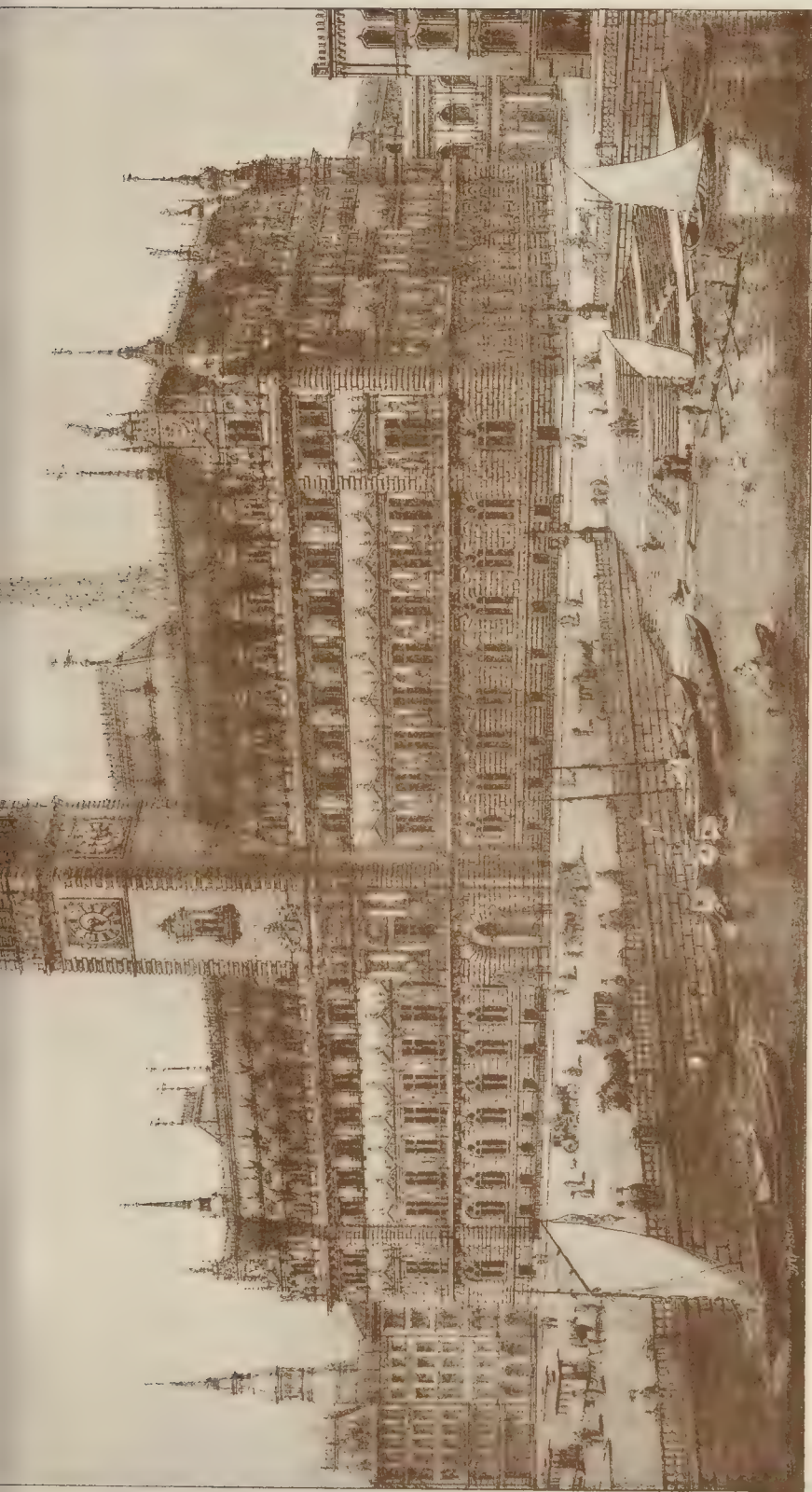


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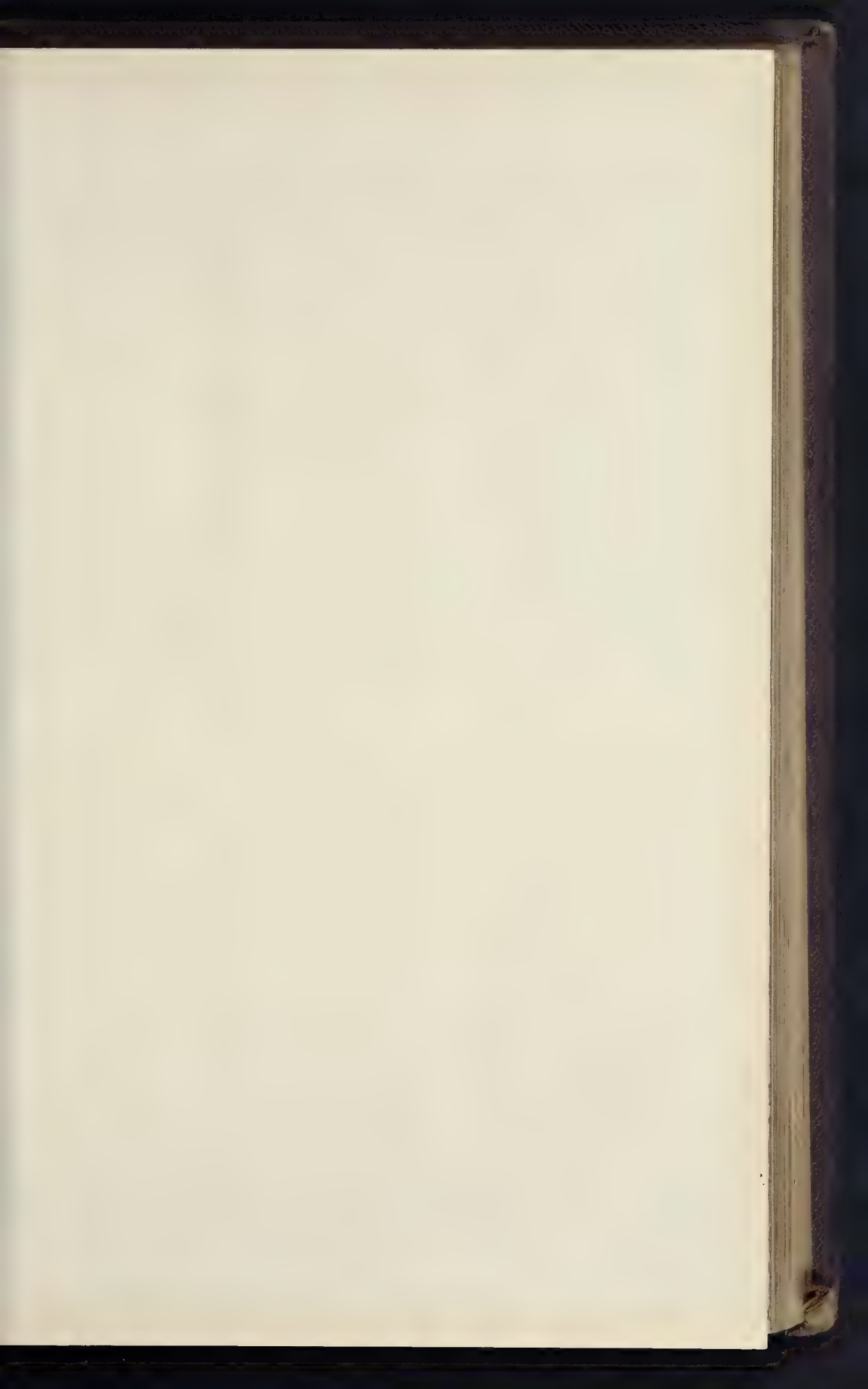
THE BUILDER, JANUARY 5 1895.



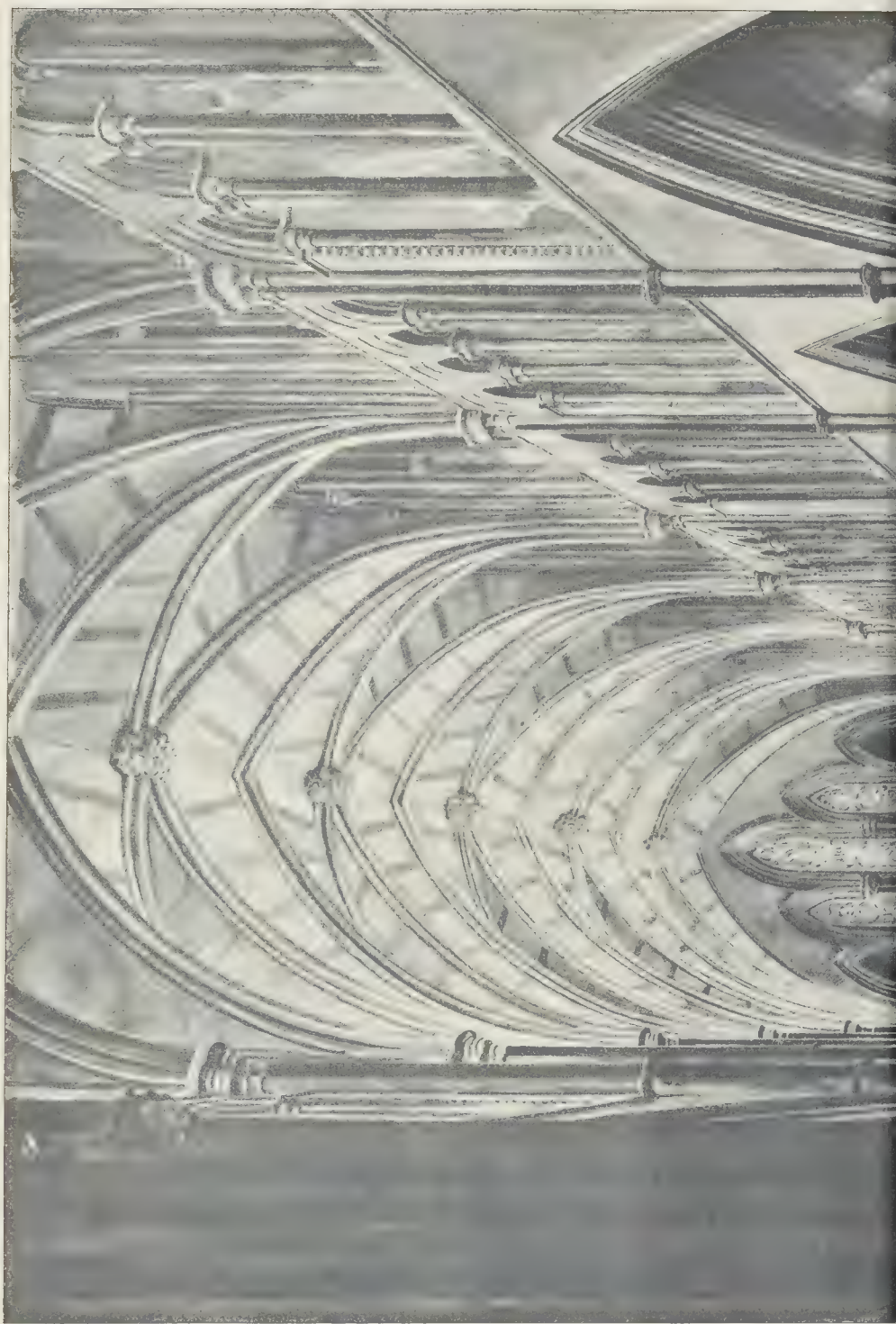


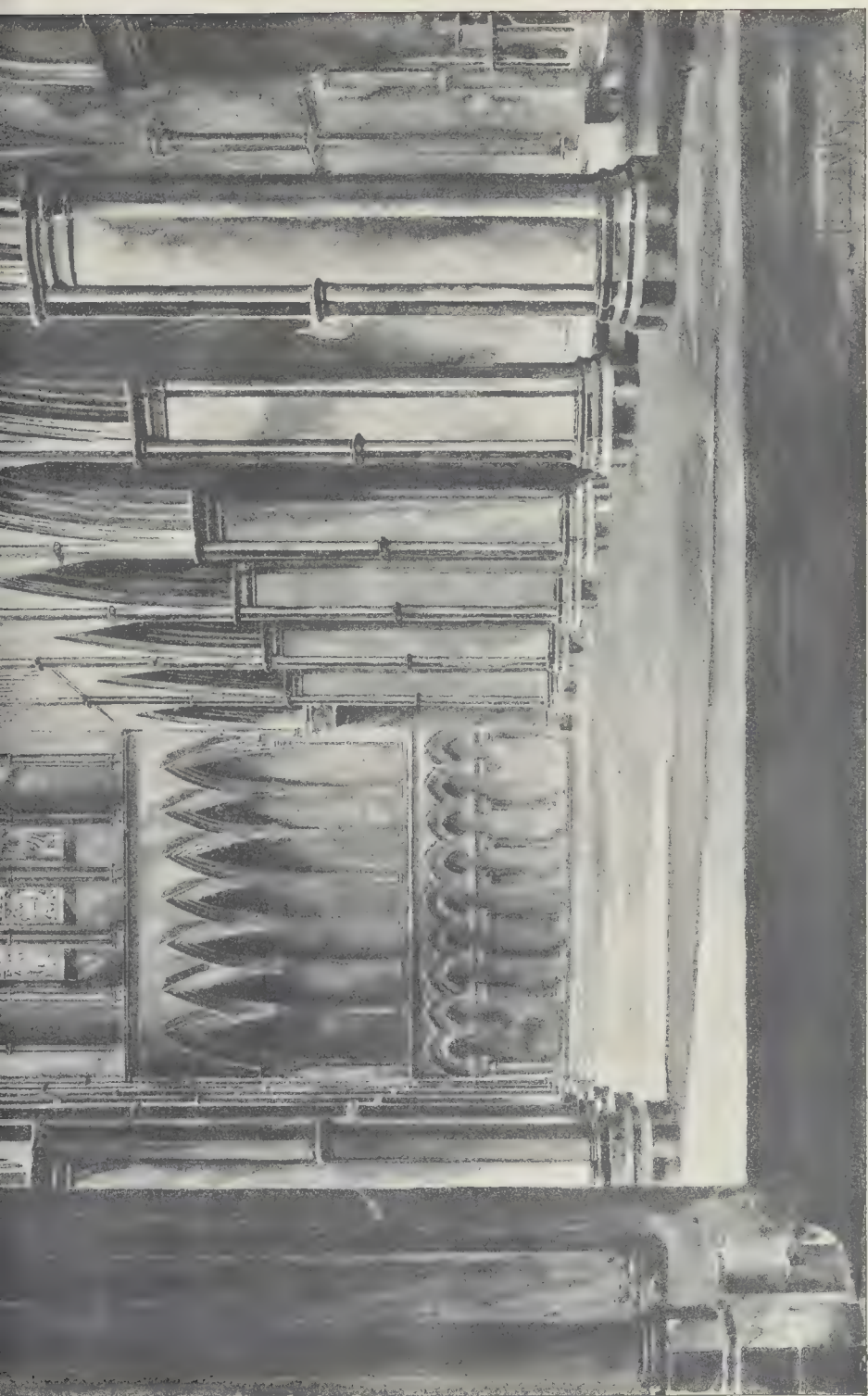
THE NEW TOWN HALL, HAMBURG

JOINT ARCHITECTS MESSRS GÖTJAN, HALLER, HANSEN, LAUFER, MEIERWITZ, SLAMMANN, AND ZINNOW



THE BUILDER, JANUARY 5, 1895





INTERIOR OF THE NEW NAVE, ST. SAVIOUR'S, SOUTHWARK. LOOKING WEST.—SIR A. W. BLOMFIELD, A.R.A., ARCHITECT.

The Builder.

VOL. LVIII. No. 2710.

JAN. 12, 1895.

ILLUSTRATIONS.

Facade of the New Opera House, St. Petersburg.—Professor Von Schroeter, Architect..... *Double-Page Ink-Photo.*
Design for a Small Country House.—By Mr. A. M. Poynter..... *Double-Page Ink-Photo.*
The Banqueting Hall, Kensington Gardens: R.A. Silver Medal Drawings for 1894.—Measured and drawn by Mr. G. Weald..... *Two Double-Page Photo-Lithos.*

Block in Text.

Details, the Banqueting Hall, Kensington Gardens..... Page 29

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Drawings at the Institute.



WHEN we saw the drawings of the Pantheon by M. Chedanne at the Paris Salon of last year, we expressed the opinion that it would be worth

while for any English students of architecture to go over to Paris merely for the sake of seeing and studying them, as examples of what could be produced in the way of architectural illustration. It is therefore gratifying to find that the Institute of Architects has prevailed on the French Government, whose property the drawings now are, to lend them for exhibition at Conduit-street. They are still on view there for a few days longer, and we advise those who have not seen them not to miss the opportunity.

The drawings, which filled one wall of a large room at the Salon of 1894, consist of thirty large frames, giving the most careful delineation, to a large scale, of the Pantheon as at present existing, together with restorations of every portion of the building as considered probable by the author. They constitute an exhaustive study of one of the most remarkable ancient buildings in existence, and merely considered as architectural drawings they merit the careful study of English students. They show what sort of work it is which passes for first-class architectural drawing in France, and what is the outcome of the system of architectural education at the École des Beaux-Arts. Of course there are two sides to the subject. It may be questioned whether the time and labour expended on such drawings is the best preparation for the modern practice of architecture; a question which has been in fact a good deal debated in architectural circles in Paris. In this country no doubt they would be waste of time so far as any practical result could be expected from them on the architect's subsequent career; because in this country the success of an architect depends almost entirely on his impressing the general public with a conviction of his competence to minister to their practical requirements. But in France, where the Government interests itself so much more in art, and where a number of official appointments are directly in the hands of the Government, such labour is probably not thrown away. The architect

who has produced such studies has gained a position which is considered to entitle him to official recognition and preferment. It is not to be supposed that an architect who has produced such a set of studies will go on devoting himself to that class of work, unless some special commission of the kind is given him. But he has won his position, and the drawings remain as a monument of his industry and professional knowledge; and if the labour expended in their production seem to English eyes rather disproportionate to the end, there is something to be admired in the high standard of work maintained in the French schools; in the fact that so much arduous work is accomplished *honoris causa*, and not in mere competition for a direct commission.

The drawing No. 4 in the collection, the coloured isometrical section showing the construction of the Pantheon, is in itself a monumental work. It may be said to be an example of the highest point of perfection to which architectural drawing can be carried; and though architectural drawing may be said to be a means rather than an end, in one sense, nevertheless we hold that it is an interesting and valuable form of art in itself, and that it is well to see from time to time to what excellence it can be carried. We have here a drawing which is in itself a kind of analysis of a great building. An exceedingly difficult problem in perspective has been, in the first place, fairly faced and completely carried out. The actual construction of the building has been, at the same time, scientifically delineated, while the whole is coloured with a skill and a feeling for harmony of effect which raise it to the rank of a work of art. Such a drawing is in itself sufficient to keep in memory the name of its author. The geometrical drawings which form the larger portion of the collection are carried out with the same completeness as to line and colour.

In the course of his labours on the Pantheon, M. Chedanne has done more than completely illustrate the building; he has had the good fortune to make some discoveries to which reference has before been made in our columns, which seem likely to set at rest one or two points in regard to the building which have been the subject of much discussion. Fergusson, with that love of theorising on the history and intent of an ancient building which sometimes led him to maintain propositions which could not be borne out by fact, had long ago suggested that the circular portion of the building was

much later than the date usually assigned to it. The idea entertained until very recently, that the Pantheon had originally been the vestibule to Agrippa's *Thermae*, converted afterwards to the purpose of a temple, had been already discredited by the discovery of the absolute disconnection between the wall of the Pantheon and the remains of the *Thermae*; but that the portico was of the date of Agrippa there can be no doubt, and Fergusson hazarded the suggestion that the portico had belonged to another building which had been replaced by the rotunda. The discovery that the masonry of the portico and the rotunda had undoubtedly been built up at the same time and bonded together seemed to discredit this theory. M. Chedanne brings it back in another form. His discovery of the brick stamps of the time of Hadrian among the materials of the rotunda furnished indubitable evidence of the late date of the latter; but the discovery of the remains of the floor of another building on the site of the rotunda and at a rather lower level confirmed Fergusson's original supposition, and left, as the only probable explanation of the facts, the supposition that the portico of Agrippa, which had belonged to the earlier building, had indeed been taken down, but had been rebuilt along with the rotunda; a supposition which is reasonable enough in itself, and which removes the only difficulty in the way of the theory originally broached by Fergusson. M. Chedanne, in the course of his explorations, has found some reason for thinking that the portico was originally a decastyle one, and he includes among his drawings a suggested restoration of it in this form. The data on which this conclusion is based we have not yet before us; possibly M. Chedanne may have something to tell us about it if, as is hoped, he is able to attend the meeting of the Institute on Monday next.

Another result of M. Chedanne's examination of the Pantheon has been to confirm the opinion previously expressed by Professor Middleton, that the Roman principle of covering in large spaces was not that of the arch or dome in constructive form, but that of a self-supporting concrete vault which had nothing of the arch but its form. The visible employment of relieving arches in the walls of the drum of the Pantheon below the dome probably led Viollet-le-Duc and Choisy to their imaginary diagrams of the construction of the dome on a kind of scaffolding

of brick arches; a construction which, as Mr. Spiers mentioned in the short paper which he read last Monday evening at the Institute, had been delineated and described by those two authorities, after a manner rather too common with French architectural historians, with all the certainty of ascertained fact. The dome, however, is constructively a mass of concrete. It is curious, however, that a concealed series of relieving arches, on a perpendicular plane, does exist, as shown in M. Chedanne's section No. 8, within the lower part of the dome, apparently intended to take some of its weight off the interspaces between the main piers of the substructure. This seems to be sufficiently provided for by the relieving arches in the drum immediately below the spring of the cupola, and it is rather questionable whether the upper series of relieving arches are practically of much use, though they were supposed, no doubt, to take some weight off the crown of those below them. Professor Middleton, however, in his valuable work on "The Remains of Ancient Rome," has shown that the later Roman builders were so enamoured of relieving arches that they were in the habit of introducing them, in a kind of perfunctory manner, even in situations where they could be of no possible use; * so that we need not be surprised to find them here.

The few drawings by the late Mr. Gribble, which are on view at the Institute rooms, are chiefly concerned with the building by which he will be specially remembered, the Brompton Oratory. They are all signed, and show that he was one of the architects who could adequately illustrate his own buildings in drawing, without having recourse to the professional draughtsman. His two coloured interiors of the Oratory are fine examples of architectural drawing, irreplaceable in the perspective treatment of a difficult subject, and coloured with great effect and solidity. The perspective drawings, in line, of the exterior of the Oratory, are very good drawings, but do not arouse much enthusiasm for the exterior design as intended by its author. The merit of the Oratory lies in its internal treatment; externally it forms no doubt a dignified building as a whole, but the details are somewhat commonplace, pilasters and panels prevailing everywhere. Internally it is no doubt one of the finest modern buildings in London.

We fear it cannot be said that the Students' Designs of this year are calculated to uphold the credit of our country very much beside the specimens of what pass for the best class of students' drawings in France; at all events, as far as the Classical work is concerned. We feel some doubt whether the Soane Medallion ought to have been awarded this year. The design to which the award has been given is a very faulty one. The subject was "A Gallery for the Exhibition of Pictures and Sculpture." The prize design, by Mr. East (an Australian, we understand), has some originality, and the treatment of the entrance portico is good, but the design as a whole is very deficient in harmony and consistency of treatment. The sculpture galleries are placed on the ground floor, and lighted from windows which are somewhat insufficient for the depth of the rooms; and aspect, in this as in nearly all the other designs, seems to be considered of no consequence at all; the lights face all round the compass. The introduction in the exterior of heavily rusticated wall niches in the upper portion of the walls (where there are no windows), above a much lighter style of treatment of the ground-floor windows, is an inversion of the proper order of things; and the manner in which the rusticated niches are jammed up against a cornice, with no moulding or frieze intervening, does not mend matters. In the plan it is a great mistake, in regard to dignity of effect, in the case of a building laid out in large sym-


metrically disposed halls, to have the entrances to the two front galleries, on each side of the central hall, coming near the angles of the rooms instead of the centre; the more so as the sculptures must be placed on the side opposite to the windows, and therefore the spectator would have to enter almost in a line with the works exhibited and go round to the front of the room to see them; the most ineffective way of coming upon a sculpture-room that could be devised. The design by Mr. Jefferis (another Australian student) to which a medal of merit has been awarded, has much more balance and character in the exterior than the prize design; the rusticated ground story is vigorously treated and the wall above left perfectly plain, with a good effect of contrast; there is the making of a good exterior in it, rather spoiled by the flashy style of drawing and the weak detail of the windows. The plan also shows the sculpture galleries on the ground floor with windows, and here again there seems no attempt to design sculpture galleries so as to give effect to the sculpture. In the other medal of merit design, by Mr. Quennell, all the galleries are on the upper floor and top-lighted, the ground floor space being otherwise occupied; there is some character in the exterior treatment, but the centre tower is certainly not beautiful.

Of the Tite prize designs the best is certainly that by Mr. B. F. Fletcher, and we are quite unable to understand why the prize was not awarded to this, which is placed second with a medal of merit. The subject was "A Garden Pavilion Overlooking a Lake;" at least there seems to have been an understanding about the "lake," though we observe that it is not so worded in the Institute's printed list. The prize design, by Mr. J. Shekleton Ballour, is a pleasing domed building in Italian Renaissance style, with a projecting columned portico and a flight of steps leading up to it on each side; it is, perhaps, in a sense the more "correct" design of the two, but the merit of Mr. Fletcher's design is that it has exactly the appearance of what it is intended for—a Classic pavilion on a lake, not a building for any other purpose; the centre block and the wings make a very pleasing group, and the plan is very well arranged, more especially as to the placing of the gentlemen's and ladies' retiring-rooms, the former being connected with a separate staircase approach outside the building; while in the prize design the two "retiring" doors face each other at opposite ends of a common vestibule. This is a prosaic matter, but it is one in regard to which more blunders are made than perhaps in any other point pertaining to the planning of buildings. A certificate of merit has been awarded to Mr. Connor for a pretty design, rather French than Italian in taste, shown in a very pleasing tinted perspective; and another certificate of merit to Mr. Kennedy, the author of the design signed "Kismet," which has merit no doubt, but not of the right kind, for it is distinctly not in the Italian Renaissance style, the encouragement of the study of which was the object with which Tite's prize was founded.

If our possible French visitor of next week is to have his attention directed to the students' drawings, he had better be gently persuaded towards the drawings for the Silver Medal and Pugin Studentship, for there he will find the English students in much better force; and in fact the drawings by Mr. A. J. Dunn, which have gained their author the Pugin Studentship, represent a kind of work that is better perhaps than anything of the same sort which would be produced by French students, who do not seem to take kindly to the sketching of Mediaeval work. Nothing could be better than his drawing of the carved details from All Saints' Cathedral; and many of the other sets exhibited contain admirable work. Mr. Joass's drawings for the Owen Jones' Studentship are also excellent. And the collection of

drawings made by Mr. Shekleton Ballour, the Pugin Student of last year, and exhibited in the Institute Meeting Room, are admirable examples of what may be done on a sketching-tour in England. They are mostly very clear and cleanly-executed pencil drawings, not too much finished to merit the title of sketches, but showing all that sketches may be expected to show, and representing also a great deal of conscientious work.

THE TWO LOAN EXHIBITIONS.

N exhibition of Venetian art sounds a very attractive title, so much of splendour and richness in artistic production is associated with the name of Venice; yet the collection at the New Gallery is rather disappointing. To look through a number of generally mediocre examples of a great school of painting is instructive, for it enables us the better to estimate at their true value the few prominent men of genius who have made the reputation of the school, and it shows that, after all, the general level of Venetian painting at the Renaissance period was not that of Titian and Giorgione, whose names have become indissolubly associated with it. Was the general level of Venetian painting, indeed, even as high as what is represented at the New Gallery? It is probable that even what we see here are more or less what may be called picked specimens—those which have been thought worth preserving when inferior ones were sold away or allowed to perish; and with that reflection one is led to ask, What would an "Academy Exhibition" in Renaissance Venice have been like, when even this collection of survivals is somewhat depressing?

There are two or three Giorgione pictures which seem to represent the painter's best characteristics in their pure state, for instance "The Judgment of Paris" (29), a small picture in which the colouring of the nude goddesses is delightful, though their figures are not entrancing; and "A Concert" (110), a dreamy group in a dreamy landscape, somewhat low in colour for Giorgione, but in other respects quite typical of the painter and apparently untouched. This can hardly be the case with the larger work, "The Three Ages of Life" (82), which is indeed fine in design and rich in colour, but the hard texture of which suggests much repainting. The greater name of Titian is represented by none of his greatest work; there are two or three which seem to be inferior repetitions of finer pictures. The "Danaë" (242) is surely not the same picture which was exhibited a good many years ago at Burlington House; if so, we are disillusioned, for our recollection as to its quality of colour and flesh-painting was of something very much finer than this. The small circular painting of the "Triumph of Love" (160), a cupid standing on the back of a lion, is a worthy Titian both in colour and subject; this was seen at Burlington House not so very long ago. The painting of the "Worship of Venus" (136) with its crowd of children or cupids, is a rather unusual Titian, and interesting if only on the ground of the treatment and grouping of the picture; this is stated in the catalogue to be "a replica with some variations" of a picture in the Royal Gallery at Madrid. There are other paintings in the collection concerning which we imagine similar notes might be made. There is a curiously second-hand look about not a few of the works to which eminent names are attached. One small picture attributed to Titian, and of a class of subject not usual with him, has nevertheless every appearance of being both genuine and the original work, this is the small painting entitled "Mother and Child" (244), a realistic group, though not treated in a realistic manner. The small picture of "Diana and Actæon" also seems to be a genuine though unimportant Titian, a sketch for a larger picture, noteworthy for

* See his curious illustration, Vol. I., page 55, of a "relieving arch" over a doorway in Caligula's palace, where the haunches alone were built and the crown voussoirs omitted.

very decorative intent with which the composition, with a sculptured fountain in centre, is treated.

One is reminded, in looking through the collection, of what was said in our pages a few weeks ago as to commercialism in Mediaeval art; for do we not find the same thing here also in the perfunctory repetition of the same types by the same artists? Here is Moroni, to whom every one's head that he paints takes the well-known Moroni type—the rather long, thin face and reserved expression, with the head inclined a little to one side. Here Pordenone repeating the same large woman with the sumptuous costume, and Bordone with that same stout and fair woman whom we know so well; Crivelli, with his eternal, stiff, religious figures, and his jewelleries and gold, and so on—each of these had his own acquired trick in painting which he could do best, and of which he was probably got rid of as many repetitions as the state of the market would bear.

Among the pictures which have some special interest in regard to subject and treatment (besides those already named) is the bust head of St. Catharine (8) by Veneziano, with flowers interwoven in the head-dress; the pretty though mannered composition of the "Virgin and Child and Saints," by Bonifazio (93); Titian's portrait of Politian (205), and that of George Grimaldi (231); Tiepolo's "Assumption of the Virgin" (177)—a very pretty drawing—of the kind of Virgin, but a pleasing and successful composition of the academical kind.

If the managers of the exhibition had been led to draw upon the best stores of Venetian painting existing in private collections in the island, they might no doubt have nearly filled the New Gallery with masterpieces; and it is clear that there must be some reason for the apparent difficulty in getting works of the first order of interest both for the and the Florentine Exhibition of last year. The reason probably is that many painters have lent or may lend their greatest treasures for the Royal Academy loan exhibitions, but prefer to draw the line there.

As last year, the "objets d'art" portion of the exhibition is the best worth looking at, though this, too, is not what we might have expected it to be. In the centre of the central hall is a carved well-head of Pozzo, admirable, agreeable to the eye in colour, but very blunt in execution, a fault apparently to be attributed to the texture of the material. Four large torch-standards in carved wood, at the four corners of the hall, of a rococo to a degree, but represent a certain rich and sumptuous exaggeration characteristic of the "triumphant city." With armour it is another matter. There is much of this, but what there is is splendid. The suit of armour (702) facing the entrance, is as fine in an artistic sense as anything of the sort could be; and it is rather interesting to notice in the rich and elaborate surface ornament of the "palettes" exactly the same type of design, with interesting strap-work, with which we are familiar in Venetian bookbinding. It is better suited to book-covers, on the whole, than to the decoration of metal surfaces. The other fine suit of armour, though not equal to the last-named, is that numbered 717; one not but be struck by the small dimensions of this suit; how many modern palettes could have any chance of getting as good as it? The case marked O, in the central hall, contains also some exceedingly fine specimens of decorative armour, especially No. 619, a morion and breastplate—the decoration of the latter one of the most useful bits of work that could be seen—No. 624, a gorget of russet steel, with a diaper pattern of foliage which is especially rich and effective.

In the other cases in the central hall contain specimens of porcelain and glass, among which some fine things are to be picked out. Case K a pair of glass flagons in gilt metal mounts, with chains (521), are notice-

able for their fine form; a teapot (533) for its peculiar, and characteristic shape, a square-shaped rather flat vessel, with a cylindrical mouth or spout in the centre of the upper side. A large Faenza plate (547), decorated with delicate blue conventional foliage on a white ground, with a coat-of-arms in strong colours on the centre, is an admirable piece of work, far better than the more striking majolica dish (548) in which an architectural design is carried in a nonchalant manner from the rim into the hollow of the bowl, suffering great distortion of line in the process; a warning rather than an example. Among the glass in case L a Murano glass cup (552) of the fifteenth century, the bowl ornamented in enamel and gold and representing a procession, is one of the most original and characteristic specimens, more for its colour than its form. Purity of form is wanting in some of these examples; two wineglasses (561, 562) are noticeable for the fine and pure form of their plain bowls, contrasting thus with other specimens in which effect of colour seems to have been aimed at rather than delicacy of form. Another example of refined and delicate form is the wineglass No. 602 in case M. The two cases contain however a considerable variety of specimens showing many of the best qualities of Venetian glass.

In the west and north galleries the most interesting portion of the contents of the cases is the lace, of which there is a large and fine collection. Various styles of lace design are represented; the broad arabesque style of Venetian point of the seventeenth century, well illustrated in No. 360 (case A), and the work in finer lines and narrower surfaces, such as is represented in No. 378 (case B), the character of which may be compared with the design of the Faenza plate before mentioned (547); they represent the same character of design, carried out in widely different materials. A border of flat lace, in broad masses with raised loops and knots (413, case D), is especially fine. Amongst the exhibits in the same case is a piece of Greek Venetian work (412, case D), introducing figures showing the history of John the Baptist; a curiosity, but not a successful one from an artistic point of view. A border of "Point Grec" in the same case (415) affords one of the rather rare examples of geometric design in lace, not unsuccessful, though it is not the character of design for which lace is best suited. The gems of the lace collection are however to be found in the specimens lent by Mr. H. Blackmore, and collected in case H in the north gallery. These are marvels of lace art, both in the matter of design and execution, and are perhaps the finest things in the exhibition, being superb of their kind, which cannot be said of the pictures. Of gold and silversmith's work there is not much, which is a disappointment; but we may draw attention to one exquisite bit of work in case A (No. 370), a gold-enamelled necklace lent by Lady Montagu, and which is quite Greek in delicacy and refinement of design and execution.

The balcony contains among other things a small collection of book-bindings, among which Nos. 757, 788, and 790 should be specially noticed. The last-named is an "Officium B. Marie Virginis" of the date of 1619, with a very beautiful design of intertwined sprays, with a special character of its own. The balcony railings are hung with a number of specimens of textiles, which make a fine mass of colour and add greatly to the coup d'œil of the central hall, when seen from below.

The pictures in the loan collection at Burlington House surprise us, as usual, with the appearance of more masterpieces, after one had thought the resources of the country must have been exhausted; and though it cannot be said that the exhibition as a whole (as far as the pictures are concerned) is equal to some of its predecessors, the first room offers a brilliant series. The central object is the portrait of "Master Lambton" (6), by Lawrence, so well known from engravings; a beautiful boy in crimson dress seated on rocks. This and the "Countess of Jersey" (94), in Gallery III., are remarkable examples both of Lawrence's powers and of his limitations. Both are full of life and vigour, in both the colour in the costumes is vivid and striking, but neither work is a great whole as the finest portraits of Reynolds and Gainsborough are. In the Earl of Durham's picture the boy is a brilliant object in the midst of a landscape the tone of which is falsified and conventionalised in order to let the figure stand out with the greater force; and in the Countess of Jersey portrait the background and surroundings are shown in flashing lights the whole effect of which is decidedly theatrical. The French critics have been seized by a Lawrence enthusiasm lately; but these two very typical works seem to stamp Lawrence as a brilliant and effective, but not a great painter. In the first room Romney's "Miss Calcraft" is balanced by Gainsborough's portrait of the not very attractive "Miss Willoughby"; but though Romney's is the more "taking" portrait in a sense, both he and Lawrence are left far behind by Gainsborough's rich and harmonious colour. Sir Joshua's "Kitty Fisher" (22), one of his many likenesses of that celebrated lady, looks as if it had been a good deal repainted; at all events, as it stands, it is not a good specimen of Reynolds as a colourist. A very curious specimen of Reynolds is the small painting of the "Tribute Money" (2), lent by Lord Houghton; an interior with small figures and a concentrated effect of light in the centre, which at first glance would be assigned to almost any painter rather than Reynolds. The first room contains three Turners; "The Trout Stream" (8), a probably early work, of which the foreground scheme at a little distance suggests Collins, but the genius of Turner asserts itself in the fine distance and the grand white cloud which fills up the sky; "Mortlake" (25), with the river suffused with a glow of sunlight; and "Helvoetsluys," a not altogether satisfying sea-piece, in which a boat on the left mounts on the top of a dark and untransparent wave manufactured for the position, in a way in which boats and sea do behave sometimes in Turner's sea-pieces, but not in nature. Constable's splendid "Dedham Vale" (29) has been here before, if we remember right, not so many years ago, but one is always glad to see it again; there is also the famous "white horse" picture, "Scene on the Stour" (38), in which, fine as the picture is as a whole, Constable has not succeeded as he generally did in "preserving God's daylight" (his own expression in a letter), as may be seen on comparing this painting with his small "Hampstead Heath" picture (14) belonging to Mr. Orrock, where the sky especially is magnificent; indeed this small work, direct and unpretending in style as it is, perhaps deserves to be called the finest landscape in the first room, in spite of the Turners. Constable's "Salisbury Cathedral" (4), though a fine work as a landscape, is an example of what we so frequently see of the inability of landscape painters to deal with architecture when they begin to go into detail; as long as Constable got the cathedral in his Salisbury pictures far enough away to treat it *en masse*, he gave a fine idea of it; but here, where it is sufficiently near and prominent to make it necessary to show some of the architectural detail, the building is coarsely and clumsily drawn, and conveys no idea of its real architectural effect and expression.

In Gallery II., devoted as usual to the Dutch School, the Duke of Westminster is a large lender, and sends among other things Rubens's well-known large picture of "Ixion and Juno" (64), which forms the central point in the room, and compels admiration for its splendid colour and breadth of style in spite of its extraordinary coarseness and vulgarity of conception. Among others from the same collection are

Rembrandt's "Gentleman with a Hawk" (50), a landscape by the same painter (53), interesting rather from the fact of its authorship than from its own qualities; the "Lady with a Fan" (54), a good but hardly a first-class Rembrandt; the same painter's characteristic portrait of Berghem (79), and Teniers's large and dull painting of "The Château" (80), interesting however to the architectural eye from the representation of the extraordinary cupola on the building. The small Rembrandt from the same collection "The Salutation" (88) is a fine work and very characteristic of its author. A good Gerard Dow (86) and a good Ostade (92) are to be noted, and W. Van de Velde's "The Salute" (62) offers an interesting study of an ancient type of battleship.

In Gallery III, the south wall makes again, as usual, a brilliant show. In the centre is Reynolds's "Lady Betty Delmé and Children" (130), a picture remarkable for its composition and built-up character of its composition. The lady sits facing the spectator, her left arm half encircling her two small children, the drapery over her knees spread out in a grand mass, and the whole forming a pyramidal group, backed by two or three tree-trunks forming a vertical mass in the rear. It is evident that the greatest care was bestowed on the composition of this picture, with a result which gives a remarkable satisfaction to the eye, even regarding it as a piece of line design. Reynolds has been equally happy in his half-length profile portraits of "Mrs. Crewc and Mrs. Bouverie" (127), seated, the one in a plain dark-red dress, the other in a light cream-coloured dress (not "white" as the catalogue puts it) with spigs of a warm yellowish tone. Both in the sentiment of the two figures and the harmony of the costumes this is a charming picture. Reynolds's portraits of two Crewc children (129, 131), the little boy "as Henry VIII." are very characteristic, and the further interest of this wall is filled up by Gainsborough's exquisite picture, "Ladies Walking in the Mall," belonging to Sir Algernon Need, and which we rather think has been in a former exhibition. The landscape is supplied by Turner's "Snowstorm in Val d'Aoste" (126), a late work, in which there is more point than snow, and his solidly-painted early work, "Bonnevill" (134), which is more prosaic but more satisfactory. Gainsborough's large "Landscape with Cattle" (128), is a fine specimen of this side of Gainsborough's art, luminous in the sky, and with rather more character in the trees than Gainsborough usually achieved.


Among other contents of the large room are Zoffany's well-known pictures (lent by the Queen) of the "Interior of the Florence Gallery" (95), and "The Life School in the Royal Academy, 1872" (100); both more valuable from the historic than the artistic point of view. Titian's beautiful head of Ariosto (109) is effectively balanced or contrasted by Velasquez' head of Olivarez (114), while the Murillo, "The Immaculate Conception" (112), lent by Mr. Cuthbert Quilter, represents the *juste milieu* in the centre of the wall; a painting graceful, sentimental, highly finished, but of a secondary order intellectually.

There is another Velasquez head in Gallery IV, "Portrait of a Young Man" (135), looking oddly out of place among the early Italian paintings, most of which are interesting rather as a matter of study than of enjoyment. There is a circular Botticelli (149)—not a very good, we might even have thought a rather doubtful one; a stern portrait of "Paolo Paruta" (159), lent by the President of the Academy, and a hard copy, on a small scale, by Annibale Caracci, of Titian's great (perhaps greatest) picture the "Peter Martyr," lost to the world in that disastrous fire nearly thirty years ago. Two of Pannini's conventional and illogical architectural scenes, "Roman Ruins" (158 and 184), and Canaletto's "The Capitol at Rome" (165), are lent by Lord Houghton. Sir Antonio More's fine portrait of Sir Thomas Gresham (180), which we think has been

here before, also intrudes into the early Italian room. A very hard little picture, a "Portrait of a Princess" (181), by François Clouet, is interesting not only for the minute and finished painting of the dress and ornaments, but for the marked expression and character in the face, which quite dominates the costume, in spite of the labour bestowed on the latter.

In the water-colour room is a collection of jewellery, cameos, old designs for silversmiths work, &c., which is, perhaps, in some respects the most remarkable portion of the exhibition, and which includes within a small space so much work of special interest to our readers that we propose to devote a separate article to it.

NOTES.

OOKING to the fact that the Royal Academy have devoted a room at their Winter Loan exhibition to a most interesting collection of decorative design, gold, jewellery, &c., we are more than ever moved to ask why, if the Academy can recognise the value of this element in the art of past times, they persist in disregarding it in their annual exhibitions of contemporary work. As far as the May exhibitions are concerned, the so-called Academy of Arts is an Academy of pictures, with some sculpture added. The small Architectural Room we can hardly accept as a recognition of architecture, so inadequate is it. We hear sometimes from Academicians that architecture is the central art, and mother of the arts, and so on; but we wait in vain for any adequate provision at their exhibitions for the illustration of architecture by means of any drawings by which it could really be properly shown and studied. At the Institute of Architects, as mentioned elsewhere in this number, there is now on view a magnificent collection of drawings by a French architect, which constituted one of the salient exhibits at the last Paris Salon. But if such a set of drawings were sent to the Royal Academy Exhibition they would be refused, because no room would be allowed to hang them: they would themselves fully occupy the one room devoted to architecture. If architecture is really the central art, the central long gallery at Burlington House should be devoted to large drawings of architecture and architectural decoration, and the centre of the room to models of architecture. Such a course would give a considerable impetus to architectural design; and the setting apart of a room for decorative work, goldsmiths' work, &c., at the May exhibitions, as is now done at the Winter Loan exhibition, would probably give an immense impulse to the improvement of art work of that class, now at such a low ebb in this country. But of course there would be less room for pictures; and it is pictures that the general public want, and we fear it is the shillings of the general public that the Academy want. Pictures are the popular form of art, because they tell (or may tell) a story, and the Academy caters for the public taste as it is, instead of trying to lead it into better channels and develop wider sympathies and perceptions in regard to what art really means.

THE interest of the excavations at Delphi has of late thrown into the shade its ancient rival seat of Apolline worship, Delos. Nevertheless, it seems probable that at Delos will be fought out and settled the fiercely-debated question of the Greek stage. In the *Bulletin de Correspondance Hellenique*, 1894 (i.-vii.), M. Homolle publishes the text of inscriptions dealing with the construction of the theatre at Delos, which was excavated in 1893 by MM. Couve and Chamonard. The inscriptions range over a period of about 100 years; the earliest (about 290 B.C.) belongs to a time when the theatre was still incomplete, and are in effect extracts from the accounts of the

"hieropoioi" charged to oversee the construction and alteration of the building. We have, therefore, a document dealing with a theatre the building of which was finished at the beginning of the third century B.C., set in hand late in the fourth; and this document gives us an exact and detailed terminology for the various subdivisions of the structure. M. Homolle remarks that point for point the Delos theatre corresponds to the rules laid down by Vitruvius, the whole disposition deriving from a circle. Dr. Dörpfeld, at Mr. Homolle's request, stated that he found in the Delos theatre fresh confirmation of his views on the Greek stage. Till his views are published, and the full plan of the theatre is before us, we reserve the discussion of the subject, but meantime our readers will be interested to study the inscription, which is manifestly of the first architectural importance.

ANOTHER discovery of great interest has also been made at Delos, and one, again, which shows that the descriptions of Vitruvius are by no means the fanciful things some have taken them to be. M. Couve has laid bare several private houses, evidently belonging to the wealthy inhabitants of the island, and dating from the fifth century B.C. They all have open courts, and the most remarkable feature about them is the inside decoration, consisting chiefly of fine mural paintings on stucco. M. Couve has also found some capitals bearing the heads of bulls and lions, and one remarkable bas-relief, said to be archaic in style with on it a procession of deities. Above all, he has found a replica of the Diadumenos of Polykleitos, said to be far finer than the Vaison statue. It is admirably well preserved.

DURING the last ten years the Prussian Government has annually voted about 1,000*l.* towards a collection of drawings illustrating the principal archaeological monuments of the country. These drawings were not prepared from actual measurements, but from photographs taken on the "photometrical" system, which allows of very exact setting-out direct from the negatives or copies. Though no great progress has been made with the drawings (a number of minor buildings only having been transferred by draughtsmen), no less than 3,300 photographs have already been taken from over 200 monuments. There is now some talk at Berlin of pushing forward the completion of the valuable collection of Prussian monuments, and continuing the work throughout Germany. Some twelve years would be required to obtain a complete collection of drawings, and an outlay of about 20,000*l.* There is also some intention of publishing drawings in a monumental work with the title "Monumenta Germaniæ Archaeologica," with Government subsidy. The whole matter deserves attention, as it would be invaluable to have a similar collection of drawings published in this country. As it is useless to expect our Government to give the matter any thought, it would be well to call the attention of our Archaeological Societies to the question.

WITH the new year the "Quarries Act" 1894, came into operation. For a long time such quarries as were being worked underground, and a few others have been placed under the "Coal Mining Regulation Act" or the "Metalliferous Mines Act," but the greater number, practically all, of quarries properly so-called were unaffected by these regulations. They were not specially subjected to inspection by Government officials, and the owners were allowed to dig the stone pretty much as they pleased. In these times of keen competition, when it is almost every quarry-owner's interest to turn out stone more cheaply than his neighbour, it is to be feared that proper precautions have not always been taken to prevent danger to workmen. T

method of paying piecework to the stone-cutters, for instance, was not conducive to safe working; in too many cases, indeed, it was acted as a premium on recklessness. The temptation to bring up the week's score above the average has been a very powerful factor in breeding that familiarity with the material, which, in course of time, brings danger into contempt. The Act now coming into operation will not altogether change the aspect of affairs, but its general tendency is undoubtedly in the right direction, and will be welcomed by all right-thinking owners. Briefly, it applies to every place not being a mine) in which persons work in setting slate, stone, coprolites, or other minerals, and any part of which is more than 10 ft. in depth; and the provisions of the Metalliferous Mines Regulations Acts, 1872 and 1875, and the Metalliferous Mines (Isle of Man) Act, 1891, with certain omissions and additions suitable to the altered circumstances, are enforced. In so far as the Factory and Workshops Acts, 1878 to 1891, have applied, and any future Act amending them will apply to quarries, the powers of the inspectors under those Acts are now transferred to inspectors under the Metalliferous Mines Acts referred to. This, of course, saves duplication of inspection, and materially strengthens the hands of Government officials working under the last-mentioned Acts. At the same time, we note that a very large number of quarries will yet be exempt from this supervision—namely, those less than 20 ft. in depth. It would, no doubt, have greatly increased the cost of working the new Act to have included every quarry within its provisions, but we think the limit might have been curtailed to advantage. Great dangers, owing to reckless working and other causes, lurk in quarries of less depth than 20 ft. As these latter are left to us we trust that those included will, at all events, be well looked after, and not inspected in such a perfunctory manner as the major part of the stone-mines have hitherto been. A large staff of inspectors will be required to do the work adequately.

THE fatal result of the Edgware-road fire, which has been the subject of much discussion, are practically due entirely to the absence of preventive measures. The fire brigade, or its employers, are in this case no way to blame. Taking it even that there was some delay in getting the water on to the fire, as suggested by witnesses at the inquest, the number of fatalities could not have been lessened. There was a fire-alarm-point close by, and a fire-station not far off, and as there were apparently no accidents in the turn-out or run of the engines, a minimum of time can but have elapsed between the first alarm and the arrival of the trained helpers. The results of an absence of building regulations that prohibit death-traps of the laundry kind or of fire-survey regulations that prohibit careless lighting and heating arrangements, have again been too distinctly seen. Now that the new Building Act has only just become law it would be inadvisable to recommend amendments which would assist the protection of life and property. A new "Fire Act," on the lines so common abroad, would be more in place. It might embrace everything pertaining to safe construction, fire survey, the powers and duties of the fire service, and the powers for criminal and scientific research. Among the duties of the fire service we would suggest the provision of better life-saving apparatus than the London fire-escape. This appliance, had the inmates really been at the windows of the premises, would have been quite useless. Its use is practically limited to the front elevation of three-story houses standing well up to the frontage line.

A CURIOUS little correspondence has been going on in the *Times* in regard to the pictures in Bridgewater House. The article in the *Times*, in a notice of the Venetian

pictures at the New Gallery, attacked Lord Ellesmere for being an exception to the majority of owners of pictures in this country, who are willing to send them for exhibition to London. Lord Ellesmere replied that he was legally bound not to allow these pictures to go out of Bridgewater House under the will of the last Duke of Bridgewater. There is no doubt that this is quite sufficient reason. The art-critic of the *Times*, however, returned to the charge, and stated that he had consulted two eminent legal authorities, who agree that the Chancery Division of the High Court, on application, would construe the will as giving permission to the tenant for life to send the pictures for exhibition. The opinion of legal authorities taken in a casual fashion, and not professionally, is of little value, but even if this opinion were correct it would be very unreasonable to expect that Lord Ellesmere should go to the expense of obtaining the sanction of the Court to send his pictures for exhibition, when anyone who is anxious to view them can obtain permission to see them in Bridgewater House. Pictures in a house in London, to which respectable persons can obtain admission if they are lovers of art, are in quite a different category from pictures buried in an inaccessible country house.

THE discussion at the Architectural Association on illustrations of architecture seems to have led to the expression of a good deal of difference of opinion between people who wanted two different things, each side not understanding exactly what the other side wanted. Mr. Pennell and Mr. Railton, however they may dislike the idea, represent popular illustration of architecture, and do not draw buildings as architects want to see them. They see effect without detail; architects see effect arising out of detail, and they want a drawing made so as to indicate correctly what the detail is. No doubt there is considerable difficulty in effecting this without hardness, in combining correct indication of detail with broad artistic effect; but we agree with Mr. Pennell that it can be done, though we are obliged to come to the conclusion that he has not effected it himself, partly perhaps because he has not tried to do so; he draws for the general public, which cares nothing about architectural detail. Another popular artist in architectural subjects told us himself that he had begun as an architectural draughtsman, but was trying hard to forget all he ever knew about architectural detail and mouldings, because it hampered him in producing his effects. One young gentleman at the Association was kind enough to say that some of our series of cathedral drawings are very good, and some very bad. Why did he not particularise, and tell us which were good and which were bad? Then we might have learned something, for it is obvious from the tone of these criticisms of the younger generation that they know everything, and that they cannot possibly be mistaken. Another speaker says that many of the drawings published in architectural journals are very inaccurate. He seems to forget that on the English system of illustration in architectural journals the majority of the drawings published are not commissioned by the journal and probably not made for publication in it, but merely lent for the purpose. The charge therefore is one against the architectural profession or architectural draughtsmen generally. It is not without foundation; we have found curious inaccuracies in drawings by very accomplished draughtsmen. But our experience of architectural draughtsmen as a rule is that they all think each other's drawings very defective.

RESIGNATION OF ENGINEER.—We are informed that owing to a serious illness Mr. W. Nisbet Blair, C.E., has been compelled to resign the office of Engineer and Surveyor to the Vestry of St. Leonard, Shoreditch.

THE ARCHITECTURAL ASSOCIATION:

Architectural Illustration.

THE ordinary fortnightly meeting of the Architectural Association was held in the meeting room of the Royal Institute of British Architects, 9, Conduit-street, on the 4th inst., Mr. F. G. F. Hooper, vice-President, in the chair.

The minutes of the previous meeting having been read and confirmed,

The Chairman expressed regret at the absence, through illness, of the President, Mr. E. W. Mountford. He then announced, on behalf of the committee, that the Architectural Union Company had agreed to increase the value of the prize offered by them for the measured drawings from 5*l.* to 10*l.*, and they had also authorised the committee to make some slight modifications in the conditions under which the prize was given. In accordance with the announcement made at the previous meeting the common room had been thrown open, and that room was now at the disposal of them all at 56, Great Marlborough-street. He had also to call attention to the notices in the current number of A.A. *Notes* with regard to the lectures that would shortly be commenced, and to state that the secretaries would be glad to have the names of members who proposed to attend those lectures. He was specially asked to remind them of the commencement of the lectures on "Professional Practice," by Mr. Lacy W. Ridge, on February 4 next.

The following gentlemen were then elected members of the Association:—Messrs. W. E. Couch, D. A. Harris, H. W. Pyc, and A. C. Martin.

Mr. F. T. W. Goldsmith (senior hon. sec.) announced the following donations:—To the library, "The Cathedrals of England and Wales," and "The Builder Album and Royal Academy Architecture, 1894," presented by the publisher of the *Builder*; and to the Studio, a cast of a Gothic capital in the Temple Church, presented by Mr. H. Stewart. The thanks of the meeting were accorded to the donors.

Mr. C. G. Harper then read a paper on "Architectural Illustration," of which the following are the portions relating to the main argument:—

The reason for the disappearance of the old and crude style of architectural illustration, and the substitution of the slight and suggestive freehand sketch, is, it may shrewdly be suspected, to be sought not so much in the love of art, but may be taken as primarily the outcome of competition; of the desire to please the eyes of committees and private clients, who yearn for pictures and cannot be expected to understand elevations.

But whatever the cause of this modern rage for perspective drawings pictorially treated, certainly the change made for interesting the great outside public, who loathed the old-time elevations, figured (I will not say drawn) with the aid of T-square and dividers. If competition has brought about this new order of things, then competition is, for once in a way, vindicated by its results, for it may safely be assumed that the steadfast renunciation, wherever practicable, of these aids to mathematical precision has, together with the growing practice of using the sketch-book, given modern architects now in the heyday of their practice much of the spirit and originality that characterised their best works. The sketch-book, indeed, is a better friend to the architectural student than the T-square. It forces him, however unwilling he may be, to self-reliance; it gives him character, decision, and emphasis. There are those who say the photographic camera is by far the best and readiest recorder of facts, and, doubtless, the camera has abundantly justified its own existence, and may prove still more useful. But the architectural student who relies in any great degree upon the camera is a lost man. A ready and practised sketcher can scarce fail of becoming a resourceful and spirited designer, while he who fills his scrap-books with photographic prints must needs become weak and ineffective. In the course of writing this paper I chanced to see a number of the *Association Notes*, in which appeared a photograph of an angle tourelle from that bold and impressive work by Mr. Norman Shaw—New Scotland Yard. That photograph, gentlemen, is, I take it, a flat, feeble, and uninteresting travesty of the bold and virile projection seen in the angle turrets of that remarkable building. Were your country members and your foreign correspondents compelled to rely solely upon that photograph for their knowledge of Mr. Norman Shaw's grim police office, they would be quite at a loss to understand the appreciations and criticisms that

have been devoted to this particular building. I am not saying that a professional photographer could not have rendered the subject adequately, but I do suggest that surely the gentleman who took this negative could have done infinitely better in a rough pencil note, the work of a few minutes. He would have brought out those characteristics of New Scotland Yard which are altogether lacking in the photograph, and though possibly his pencil might fall short of absolute accuracy of proportion, he would not fail to show something of its spirit, which has, unfortunately, never entered this negative.

Since the first introduction of the perspective sketch into the work of architects' offices and into the pages of your professional newspapers, the question of style in drawing (and more especially in architectural illustration) has been always more or less under discussion, but never, perhaps, so constantly as now.

Years ago when the measured elevation was the utmost that your professional papers attempted in the way of illustration, the artists among you groaned in spirit at these bald and altogether artless productions of the architectural drawing office, and sighed for perspective views. Well, now-a-days you have your perspective views—and the picturesque is cheap to-day. Architectural illustrators, lay or professional, whether they be working for a technical audience or for public approbation, will be romantically "picturesque," no matter what their subject. The spirit and feeling of any particular subject, truth, reticence, dignity, and every sober quality may go hang, so only they may run riot in "picturesqueness." They have made the appellation hideous; so much so, indeed, that if you forgive me the frequent employment of that offensive term, it will be no little exercise of charity that urges the absolute. It is, however, by iteration that I would draw your earnest attention to the enormity (no less a term will serve my turn) that falsifies architectural illustration, until nine-tenths of the work done to-day is arrant and ill-judged convention. Restraint is at a discount in illustration and design. I saw, but the other day, an illustration of an exquisitely simple, and yet most striking, house in Queen's Gate, a modern house doubtless familiar to you as architects, a house which even a layman, like myself, can identify with Mr. Norman Shaw. That house in its Georgian restraint and precision, its four square red-bricked walls and its green-shuttered windows, wears a noble and stately look that puts to shame the stuccoed respectability of the '60's across the way. Quiet dignity is the note of that house, but the frantic draughtsman who illustrated it revelled in spots and blots and a romantic decrepitude that deprived the architect of all the credit due to him for his reserved force, and left no vestige of quiet there. This class of draughtsmanship is almost exclusively pen-work, and it had at one time the merit of a cunning use of black and white.

To Mr. Herbert Raiton, with whom it originated, belongs the credit of using the pen with vigour and effect, but in these days the excesses of this manner and the convention in which these drawings are executed would lead one to believe everything was going up to kingdom-come in a dynamite explosion. They have already brought it into discredit.

This is no plea for a bald and merely matter-of-fact style of drawing. Some of your most distinguished architects have wielded a most poetic pencil, and one cannot object to poetic feeling in draughtsmanship. Only, no one requires, the high-strung epic flights rehearsed by these extremists.

As an instance of the way in which a picturesque drawing (I use the phrase in an ironic sense) may not be an illustration, I would ask your attention to this sketch of the "White Hart," Dorchester. Now this particular "White Hart" is a country inn, stuccoed and white-painted, and kept, when last I saw it, in apparently an excellent state of repair. Its frontage, as you may see by the companion illustration shown here, has a character of its own, and though it can scarce be called remarkable, it is yet interesting as the type of an old hostelry, commonplace enough in its day, but nowadays, with modern rebuilding so active, rather the exception than the rule. Doubtless this also will soon be of the past. I take it, therefore, to have been more than ill-judged in an artist to have represented this place in so inadequate and misleading a manner as by perpetrating a crude and exaggerated view of its gable end. It were as allowable in a photographer to photograph the back of a sitter's head and to call the result a portrait. I think you will deplore, equally with myself, this licence which has perverted the topographical illustration of the time

to such an extent that the characteristics of the places represented have been lost in the mannerism of draughtsmen, who render everything quaint and pretty, from Buckingham Palace to the Old Bailey. But this manner, after having been a fashion for some ten years, is fast becoming discarded, even by that noun of multitude, the public. The public at one time approved this prettiness, and the editors of illustrated periodicals (I sincerely hope there are some in this room tonight to hear me!) liked it too. They loved to see architecture rendered as so much lacework, and true architectural draughtsmanship found no favour with them. It remained for your professional papers to bring architectural drawing back to illustration, properly so-called.

There are particularly good reasons why you should receive with caution the utterances of many modern writers upon art, from Mr. Ruskin downwards in the literary scale. Your professional press has before now shown how and why Mr. Ruskin is not to be taken seriously upon architectural matters, and he is but the archtype of a class whose literary gifts and rhetorical flourishes serve only to cloak their ignorance of technique.

While art remains a matter of temperament and individuality (as it must ever remain), I would urge you to seek your own salvation in methods of expression, and to take no man's advice as to the style and manner you should adopt in drawing. First, however, you must learn the grammar of your art, so that you do not transgress its fundamental rules, nor exceed the limits of a particular medium. Originality is one thing; licence quite another. And let us always bear in mind that each medium has its own peculiar and inimitable strength; that a pen-drawing cannot and ought not to compete with wash, crayon, or pencil; nor for that matter should etching be brought to imitate engraving. Yet this is constantly done. Pen-drawing, together with pencil work, are the chiefest of the methods used in architectural illustration, and photo-lithography has hitherto been by far the most frequently-employed means of reproduction in your professional journals.

Brown inks are, of course, only to be used with discretion and with the knowledge that modern processes of reproduction, based as they are on photography, will render them as strong as though the lines were drawn in the deepest black. Processes other than lithography have hitherto had little interest for the architectural draughtsman, for his work had been chiefly reproduced in the pages of his technical papers, and they, as already mentioned, use chiefly that one method. But now that all kinds of process work are becoming cheaper, it is not unlikely that in the near future these papers will use a larger variety of methods than they have done hitherto. As I judge it will be of interest to show some reproductions of pen-drawings made for book-illustration, and have hung here some six frames that exhibit at one glance the drawing and the reproduction. Here are drawings made with ebony stain upon paper and cardboard, and reproduced by line processes and by tone. Most of these drawings are made with a pen, and I have selected them especially because I think line work is of more interest to you than wash.

Here is an essay in the application of the mechanical tint known as "Day's shading medium," an invention which may be succinctly indicated by saying that the shaded effect is produced from engraved sheets of gelatine bearing a close concourse of dots in relief. These gelatine sheets, when inked up with a printer's roller and pressed with thumb and finger upon the zinc plate on which the drawing is etched, produce the dots you see eventually upon the print. You have, however, nothing at all to do with that, but simply indicate to the process-man by scribbling in blue pencil (or making a blue wash) on your drawing where you intend these dots to come. You, in fact (to adopt the well-known phrase) make the scribble: he does the rest! The Kodak-like simplicity of this method has led to its very widespread adoption, but in most instances you will find that these tints have been used merely as labour-saving tricks, and rarely as artistic help-meets; and so an unmerited stigma, which should really be the portion of the uneducated and artless draughtsmen who use these devices wrongly, rests upon the shading mediums to-day. True, they are mechanical, and that adjective is one of evil repute when used in connexion with the arts; but as aids to speedy and effective shading they are of the greatest service to the draughtsman who draws for reproduction with a pen.

In this illustration of "The Three Spires,

Coventry," at evening, my object has been to show the twilight hour when the lamps are lit and a pearly-grey haze settles down upon the streets, leaving those soaring spires silhouetted against the sky. I imagined this could be adequately conveyed by tint, without the necessity of using the half-tone process; and the result shows that this view was correct. There is, however, a suddenness in the purely silhouetted parts which is rather unpleasant. A treatment of the spires in close horizontal lines would have been more suave; or they might, even now, be altered on the present block. That is to say, if the block were returned to the process-man with instructions to rouletted those portions, he would use a little instrument called a roulette upon them to produce a series of microscopic indentations in the zinc which would print as a grey mass, not, as now, in pure black.

But now to leave tints and come to quite a different matter. You will have noticed, I doubt, that the process-man (and indeed many writers upon this question of reproduction) insist upon your drawing for line-process with as clear and sharp a line as possible. He will not hear of you leaving pencil-marks upon your paper, but will tell you that every trace of pencil must be carefully removed before he can attempt to make a block from the drawing. Paper, did I say? Nay, he will not hear of the draughtsman using paper, but only cardboard of the whitest and smoothest variety. Now, this, of course, is done chiefly to make his work the easier, and in order to produce blocks that may show a sharp, clear line. Of course, there are many kinds of drawings where a line of this description is desirable. We will not discuss them here, but will just consider a case in which such characteristics are to be avoided.

Here, you will see, is a sketch of Corfe Castle. Now, Corfe Castle is a wild and rugged ruin, weather-beaten and time-stained. There are, in fact, no sharp, clear lines about it at all, and it would not be advisable that you should introduce any lines of that character into a drawing of it. Obviously the best thing to do would be to make a mixed pen-and-pencil sketch. I have treated Corfe Castle in that way. But you would make a very great mistake if you sent such a drawing to be reproduced by an ordinary line-process, which would either omit your grey pencil-marks altogether, or else would render them a pure black. The only method by which such drawings can be adequately reproduced is by the swelled gelatin process. Of course, the cost is appreciably higher than if the reproduction were made by the more ordinary methods, but the result is worth the price to all who care for these minutiae; and what artist does not?

At the conclusion of Mr. Harper's paper, Mr. F. T. W. Goldsmith read the following communication which had been received from Mr. Phil Spiers:—"Whilst I agree in the main with Mr. Harper's interesting arguments, which deal with architectural illustration, as the paper is read before a society of students, I should like to point out that it does not necessarily follow that the class of drawing which is likely to be indulged in by the student on tour is that which lends itself well for illustration. I say it does not necessarily follow, because I recollect that one of the first and best publications in black and white which was produced in 1858 from the drawings of Mr. Norman Shaw, the result of his work as Travelling Student of the Royal Academy. These drawings, however, were not made for the purposes of publication, and it was only on return that he was persuaded to allow them to be reproduced as architectural illustrations. I have never seen the original drawings, but it is possible that the lithographic reproductions were worked up to some extent to make their publication more popular. Now, I take it, the principal object the student aims at when making a sketch on tour is to learn how to draw art, how to observe, and if he once gets into his head that there may be a third object, viz., that of publishing his drawings, he runs the risk of neglecting the first two. The accidental efforts of fleet shadows, the careful blackening-in of every brick shade, and the picturesque effects of broken stone courses exercise such influence on him that he has entirely forgotten the architectural design of the building he has drawn, and is only able to console himself with the reflection that, has, at all events, turned out a very pretty drawing, which is the admiration of his brother students (and perhaps his friends), and will also do admirably for publication. I do not wish to discourage the student

who desires to add to his laurels by the execution of drawings which will give him a chance of carrying off the prizes in the Architectural Association studentships, of adding to the value of the Architectural Association sketch-book, or of assisting in the illustration of architectural drawings in our professional journals. In fact, on the contrary, I not only think such aims perfectly justifiable, but I think it may excite the student to much more serious work than he might otherwise have attempted. I do, however, say great stress on the fact that his first and main object is to learn. That object may be attained in two ways, either by measuring and plotting on the spot, or by careful delineations of perspective drawings. The first method has been quite discounted by the reader of the paper, who even objects to the use of the T-square in the making of the perspective drawings. I think the student is justified in making use of any assistance in that way, provided that he does not become the slave of his drawing instruments. There are many buildings, the distinctive character of which mainly depends on the absolute regularity of their vertical and horizontal lines, or the parallelism of others. Excepting half-timber houses and other such picturesque structures, there are any which do not? And why should the student forego all the training he has received in the office and laboriously try to work without the ordinary instruments of the craft? Even with the T-square it is possible to draw an artistic line, without taking to the expedient which the late Mr. Joseph had resorted to in Pugin's office, viz., notching all the T-squares, or cutting pieces of cardboard in gentle curves to give a flowing line to the tiles of a roof. There are two types of drawing I would recommend to the attention of students about to travel. The one is that which was pursued by the late Mr. Wm. Burgess, the other that of the late Mr. George Edmund Street. Mr. Burgess happened to be very short-sighted, and was obliged to use opera-glasses to see at a distance. This made it difficult for him to make perspective drawings. He set to work, therefore, to measure and analyse the construction of the buildings he came across. He was not content with the external appearance, he virtually dissected a building or some distinctive feature of one, so as to see how it was put together. On one occasion he measured portions of the choir of Beauvais, on another the *flèche* of Amiens—I think, both stupendous structures, which show that his short-sightedness did not interfere with his powers of observation. He took up any phase of art workmanship, and Mr. Krall, the ecclesiastical worker in metals, told me that Mr. Burgess's designs for chaises, &c., were absolutely perfect, and showed in detail how every part was to be put together. Mr. Burgess was led eventually to publish his drawings, which are in the library, so that you will be able to take note of his field of work. Mr. Street was the most prolific sketcher I have ever had. I met him once at Mont St. Michel, when he told me that he had measured the plan and made a perspective drawing of the choir of every important church in Europe. On a previous visit to Mont St. Michel he had not been able to get inside the church, as it was used for a prison, so that then he had to return (in 1880) to complete his series. I am not aware that he ever made use of his sketches; his object was to impress the buildings on his memory and to penetrate into the thoughts and reasonings of the Medieval builder. His sketch-book measured $8\frac{1}{2}$ in. high and $6\frac{1}{2}$ in. across, and he frequently drew across the two pages. He always drew freehand and never used india-rubber. This, however, necessitated far greater care in the first setting out. He was extremely careful in the profiling of his mouldings, the mass of which was always proportional to the structure, as shown in his drawing, and he contented himself with only drawing one or two lines through. I published one of the drawings in my book on "Architectural Drawing," his son having kindly lent me the drawing for that purpose. I had to trace it for reproduction, so that it loses some of the artistic value of the original. It represents the tower of Andrieu Church in Normandy, I think, and although it is in perspective virtually, or the student it is worth more than a $\frac{1}{4}$ -in. scale drawing. Mr. Street's drawings were purely architect's drawings, and would probably be quite unintelligible to an outsider. There is no doubt that he was passionately fond of drawing, but his main object was to store facts in his memory, which I recommend to the serious attention of students as their first consideration. At any time any of you should wish to turn your drawings to account, then I would ask you

to look through Mr. Prentice's work on Spain. In that case the drawings were made for the purposes of publication, but they are distinctly architect's drawings, and probably do not appeal much to the general public.

The Chairman remarked that the subject of the paper was interesting to them all, and they were favoured with the presence of several gentlemen who were recognised as leaders in the matter of architectural illustration. He would ask Mr. Pennell, who, by his work, was well-known to all present, to open the discussion.

Mr. J. Pennell said that although in his small way his experience of architecture had not been altogether satisfactory, he must admit it had been somewhat amusing. When he had attempted to say something on the subject, he had been met with the reply, "You are not an architect, and had better not have said it," and when he had said nothing he had been invariably met with the query, "Why haven't you said something?" It was always so amusing. But that was a detail. There was one point about the paper that struck him, and that was that he did not quite understand it. A great architect, an Englishman, who died some years ago, divided drawing, as practised by architects, into two classes, and he did it remarkably well; he said a drawing made by an architect was either a technical architectural drawing or a drawing of architecture. Architectural drawing was nothing more than the dry bones of architecture, which he knew nothing about, and cared for a great deal less; it had absolutely nothing to do with the fine arts, but everything to do with architecture. But, on the other hand, the delineation of architecture had really nothing to do with architecture primarily, but everything to do with the fine arts, and when they went into that they entered a field in which he took a great interest. Referring to what he called architectural sketching, Mr. Harper said it had only been practised within the last few years. That must really have been meant as a joke. He did not know that the early Briton, who was painted blue, made drawings of architecture, but as soon as drawings were made architectural features were introduced. Not to go into historical discussion, one might commence with Albert Durer as a characteristic man; he was for ever sketching architecture in a most amusing style, though whether the members of this Association would say that his buildings would stand up or not he did not know; all he knew was that architects used his sketches extensively from that day to this, and they could see bits of his work in almost every block of Gothic buildings put up at the present time. Durer was certainly a most useful man, although he did not know anything about architecture. Then Canaletto and Piranesi both made drawings of architecture, though whether they ever studied architecture or not he did not know. To make another big jump: when they came to the beginning of the present century, they found other men; in fact, the greater part of English art was devoted to the rendering of architecture. So far from the drawings of architecture being the growth of the last few years, as Mr. Harper said, they had been the growth of several hundred years; in fact, technical architectural drawing had been practised ever since the time of the first architect. Even Hogarth rendered architecture, and Reynolds, almost the sole great Englishman who scarcely touched it, did so in some of his backgrounds. But Turner and Girtin certainly made their reputations solely by their drawings of architecture, and later on those by Prout, Cotman and Harding gave to these artists an international fame. Mr. Harper had said that Ruskin was not to be taken seriously as to architectural matters, and had spoken of his ignorance of technique. He must have certainly been laughing when he said that, or else he had not seen the Ruskin drawings at the Oxford Museum or the fine reproductions of them by George Allen. Some of them neither tried nor intended to make drawings from which buildings could be erected, but they tried to make the drawing look pretty. Of course, many architects did not pretend, as in the *Builder* series, some of which had been shown there, to really render the true effect of the building. Architecturally, Mr. Mitchell's drawing of Durham Cathedral, for example, was probably perfect, but pictorially it was unfortunate—it seemed to him to be wanting in almost all the characteristics of that wonderful place. It did not give any effective light and shade, or any idea of the position of the cathedral, which was really most magnificent. There was nothing pictorial about it whatever. Probably Mr. Mitchell would say he did not want it to be pictorial. The old architects cared a great deal for light and shade

and position, otherwise they would not have put the cathedral where it stood, and therefore it seemed to him these things might be taken notice of. He understood Mr. Mitchell had to give a true proportional rendering of the buildings, but at the same time he did not see why another person could not do that and add in the pictorial quality without harming the architecture in the least. He had no hesitation in saying he was only too glad to get the assistance, as he had done in many of his drawings of cathedrals, of some competent architect to help him to get them perspectively right, and he could not help publicly thanking one man who had assisted him enormously in this way—he meant Mr. Mallows, whose beautiful drawings they all knew. But this had also been done by all artists who had attempted architecture; at the same time, they had probably helped architecture too in this way, and he could not understand why Mr. Harper did not mention even Mr. Mallows or Mr. Horsley. As far as the drawing of the White Hart at Dorchester was concerned, he did not see why one man could not draw a building in one way and one in another. There was one or two classes of men who said "we are the salvation and the salt of the earth, and because you don't draw in our style you cannot draw at all." But what was really wanted was individuality and character, so as to get all sorts of beautiful drawings. He was glad Mr. Harper appreciated Mr. Raffles Davison; he was sorry he did not appreciate Mr. Railton. One made a drawing one way and one another, and at the same time Mr. Railton was an architect. In conclusion, the speaker said that when they saw tiny little bits of drawing in papers it must not be thought they were thrown off without trouble; there was as much serious work put into them as there was in any sort of art, and unless it was done in that serious way, not much would come out of it.

Mr. W. S. Weatherley referred to his own experience with regard to architectural illustration. About the year 1877 he was commencing to illustrate Mr. Gilbert Scott's lectures, published by Mr. Murray, and as there were a very large number of illustrations the question had to be considered how the work could be done economically. After some investigations he came upon a process which, at that time, he believed, was quite new, and by which drawings were produced by means of photographs on zinc plates; as far as line drawings were concerned, this produced very good results indeed, and, with very few exceptions, the work was illustrated in that manner. Possibly the process was still largely used for such work as that to which he referred. Observations had been made with regard to illustrations that should satisfy architects and yet be pictures. It seemed to him they were rather striving to combine two things which it was impossible to combine, for pictures from an artist's point of view could not show the detail that an architect looked for.

Mr. H. Hart considered Mr. Harper's remarks on the drawing of the White Hart a little unfair; it had struck him as being rather good, and, compared to the drawing which was supposed to illustrate the building more clearly, he regarded it as distinctly superior. It was not at all a necessity in such a case for the artist to stand immediately in front of the building.

Mr. E. Greenop, in proposing a vote of thanks to Mr. Harper for his paper, took it that that gentleman had a grievance, as his tone was pessimistic, though he (the speaker), had not been able to discover what it was. Mr. Harper had eulogised the cathedral drawings that had appeared in the *Builder*; he (the speaker) thought everybody would admit that some of them were extremely good, but some were not so. A good many of them lacked what he might call artistic feeling. Notwithstanding what the reader of the paper had said with reference to the photograph of New Scotland Yard that had appeared in the *Notes*, he regarded it as a really good illustration; he hoped they would have a good many more of such photographs. Again referring to the illustrations that had appeared in the building journals, the speaker observed that opinions differed very considerably on these points, so he thought it was rather unsafe for anyone to come there and pick out any particular work and eulogise it, while condemning the work of other people. Many drawings that, as architects, they looked upon as beautiful were really too crammed with minute detail in the distant parts of the subject to be good pictures.

Mr. Herbert Railton considered it most extraordinary for a man like Mr. Harper to speak as he had done about architecture to those who had

spent many years of their lives in working at it, and who could not only draw a building, but also construct it. Many people could draw architecture, but very few of them could construct architecture on paper. It was a simple matter to make a pretty drawing, but it took very great knowledge and study to draw a Tudor arch, a geometrical or a lancet window. Those who could do that were such men as Mr. Mallows and Gerald Horsley, whose names the lecturer never mentioned, and those who had been thoroughly trained in an architect's office. Mr. Pennell drew what he saw—he drew architecture because he admired it, and he gave the colour, feeling, and poetry of the architecture. He (the speaker) had been assailed about his curious schemes of effect. But he had been copied right through, and the market had been flooded by absolute imitations of his work. Why? Because that was what the publisher wanted. He made his living out of it. But there was one thing that these copyists lacked, namely, a knowledge of architecture—they could never draw a Tudor arch or lancet window. To put poetry into brick, stone, or slate required great gifts. Then as to moated granges, who originated them? It was a man named Sam Read. A moated grange as created by him, with pinnacles and crows' step gables, was never seen in England; the granges in this country were simply barns surrounded by water, hence moated. He (Mr. Railton) had been wrongly credited with originating such buildings.

Mr. J. Osborne Smith said that one of the first conditions necessary to the production of a satisfactory architectural illustration was accuracy, and this was wanting in many of the illustrations that appeared in journals. He would particularly impress on the young members that sketches to be forcible and to bring out the beauties that were in the original should, above all, be accurate.

Mr. Goldsmith seconded the vote of thanks to Mr. Harper, and emphasised Mr. Railton's point that nobody could draw architecture so well as a trained architect. He wished the public would realise that.

The Chairman felt that the speakers had been driving in two different directions. There were two kinds of architectural illustration—that which the architect made as a student for his own purposes, and that which might be characterised as a representation of architecture which was circulated amongst the public. The two things were entirely different.

The vote of thanks having been passed, Mr. Harper briefly replied upon the discussion, and declared that Mr. Railton had labelled the moated grange, which he personally regarded as a very fine old building. The "White Hart" at Dorchester was ugly, and he had drawn it so; it was wrong to make an ugly building pretty in a picture.

The proceedings shortly afterwards terminated.

THE SANITARY INSPECTORS' ASSOCIATION.

THE annual address of the President of this Association, Sir B. W. Richardson, was delivered on Saturday last, at Carpenters' Hall, at an extraordinary meeting called for the discussion of a series of resolutions proposing to rescind one of the articles of association, and to substitute other regulations. The President referred in his address to the continued progress of the Association, and the meetings which had attended the two provincial meetings of the year held at Nottingham and Ramsgate respectively, both of which he regretted to have been prevented from attending. He regretted that the constitution of a new examining board by the Government, under the direction of the Local Government Board, had been settled in a spirit that was neither liberal, nor fair, nor useful, inasmuch as on that board, upon which the duty of examining future sanitary inspectors was thrown, not a single sanitary inspector had been placed. They must keep pegging away until they had obtained on the board fitting representatives who properly understood their duties, responsibilities, and interests. The duty committed to the sanitary inspectors might not be captivating, but it was most important. It was for them to make those observations which, in the words of a great American physician, Dr. Ben. Rush, should not, however insignificant apparently, "be allowed to pass from the public eye, for there are mites in science as well as in charity, and the ultimate results of each are often equally important and beneficial." They need not trouble themselves about the controversies in regard to discoveries in sanitation; their duty was to observe, and to know

how to turn their observations to account. In the course of his address the President protested against the narrow views of the new school of sanitarians, who, he thought, too much neglected not only the importance of inculcating on the masses the necessity of personal cleanliness, but neglected the study of the influence on health of those great comical causes without which it was impossible to account for many of the strange phenomena which accompanied the outbreak of new epidemics and new forms of disease. Many theorists engaged in processes of "inoculation," or the "stamping in" of disease, but the duty of inspectors was the "concoction, or stamping out" of disease, as soon as it manifested itself, and so long as they held faithfully to that duty they would inevitably take the lead in public estimation in consequence of the grander practical results that would emanate from their exertions. The President concluded with the expression of a wish for the Association of a new and prosperous year of work.

In the course of the remarks made by the mover, seconder, and supporters of a vote of thanks to the President, the tendency on the part of certain members of the medical profession to derogate from their proper duties, to take up the administrative duties which were the proper province of sanitary inspectors, was condemned, and in reply after the resolution of thanks, the President expressed his own sympathy with the views of the inspectors.

The business of the extraordinary meeting was subsequently proceeded with. A resolution consisting of many clauses was then submitted, supported by Mr. Taylor (St. George's, Hanover-square), the Chairman of the Council, Mr. H. Thomas, the late chairman, Mr. Hugh Alexander, and other members, and opposed by Mr. Wilkinson (Derby), Mr. Fairchild (Battersea), and others, a long discussion ensuing. The principal object of the resolutions was to dissolve the connexion of the five existing provincial centres, including Liverpool, Manchester, and Yorkshire, in favour of a new form of affiliation, which would bring into more direct membership, as the supporters of the change contend, a large number of provincial inspectors. It was proposed that any ten or more actual holders of appointments as inspectors in any district of the United Kingdom may apply to the Council of the Association for the formation of a branch of the Association for that district. After a long discussion the resolutions were negatived.

Mr. E. Tidman has been elected Hon. Sec., in place of Mr. Legg, resigned.

MAGAZINES AND REVIEWS.*

THE most important article in the January number of the *Gazette des Beaux-Arts* is that by M. Chas. Viatte on Isabella d'Este and her influence on the art of her time. The article is illustrated by engravings from several contemporary portraits of Isabella and of her husband Gonzaga. M. Emile Michel contributes an article on the new Memling at the Louvre, with an engraving of this fine example of the artist, the subject of which is "A Donor presented by John the Baptist." M. Marcel Raymond writes on "Florentine Sculpture of the Fifteenth Century," the article dealing mainly with what may be called architectural sculpture—carved ornament. M. Edouard Rod contributes a short article on a modern artist of genius, M. Marcelli Desboutin, some of whose etched portraits are reproduced as illustrations.

The *Art Journal* devotes an article to "The House of a Japonist collector," written by Mr. Ernest Hart, the collector in question, who is known to have an exceptional private museum of Japanese work. The article is illustrated by engravings of various objects, which are all highly characteristic of Japanese humour and fancy, and also, for the most part, to our thinking, very ugly. Mr. Shaw-Sparrow writes the brief commencement of an article to be continued, on "Paintings and Sculptures as Historic Studies"; a most interesting subject, but the author does not get far enough into it in the present number to enable us to judge of his point of view. Miss Gill's article on "Yorkshire Crafts—worsted and woollens," gives a great deal of practical information, accompanied by some very charming

illustrations of different designs in this class of textiles. Mr. James Orrock's sympathetic article on William Hunt, with numerous illustrations from his works, will be enjoyed by all who appreciate Hunt's manly and unaffected, but powerful, genius. "Layer Marney Tower and Church" is the subject of an illustrated article by Mr. T. McDougall Mundle. The two full-page illustrations are from Sir F. Leighton's "Garden of the Hesperides" and Béraud's "Le Chemin de la Croix."

The *Studio* (the December number) contains an interview with Mr. Walter Crane—that is, an expression of Mr. Walter Crane's opinions—on the subject of designs for paperhangings, with various illustrations from his work of this class which it is needless to say are very beautiful and interesting. We observe that in expressing his admiration for some of the new American architecture of the school of Richardson, Mr. Crane remarked that he could not discover that Richardson and his followers gave any special attention to designing the interior fittings and decorations of their houses; these things are mainly, as with us, regulated by fashion. The "interview" was Mr. Aymer Vallance. "New German Designer," J. Sattler, is the subject of an article illustrated by designs which have all the grimness and some of the grotesque humour and powerful satire of Mediæval German art, especially "The Modern Dance of Death," a skeleton dancing on stilts over the pages of an open book and leaving great blotches of black behind him. Amongst miscellaneous notes is one on the usefulness of slates as a ground for oil-colour sketches, and the suggestion of slate in general as a durable ground for large decorations either for exterior or interior work.

The *Architectural Record* contains a long article by Mr. Montgomery Schuyler, with a profusion of illustrations reproduced from photographs, on the very interesting subject of "Old Colonial Architecture," the Renaissance architecture of America during its early period of existence as a country colonised by the descendants of Englishmen. The article ought to be of interest to English architects. "The Musical Ideal in Architecture," by Mr. H. Taylor Boormer, is an attempt to carry, we think rather too far, the often-recognised analogies between music and architecture; it is nevertheless an interesting paper, and promotes thought on the subject. An article on "A White-Enamelled Building," by Mr. C. E. Jenkins, gives some account of the construction of the Reliance building at Chicago, "the first enamelled building erected," a sixteen-story building faced altogether with cream-white enamelled terra-cotta. This is a novelty, at least; whether a desirable precedent we should hesitate to say without having seen the building. It is, of course, one of those steel structures not common in the States, in which the visible outer wall is only a kind of curtain to the real construction. As we have before said, we do not consider this a very true type of architectural construction.

In the *Engineering Magazine* (New York) Mr. Goodyear writes a paper on "Historical Architecture in Current Use," which is an attack, in more complete and logical form than usual, on the use of past styles in modern architecture. Mr. Goodyear thinks a great deal too much attention is devoted to "styles," and that a consequence is that we have no "style." He recognises the value of tradition in architecture, but why is not the tradition of 1893 of so much value to 1894, instead of a much older tradition? There is a good deal to think about in that.

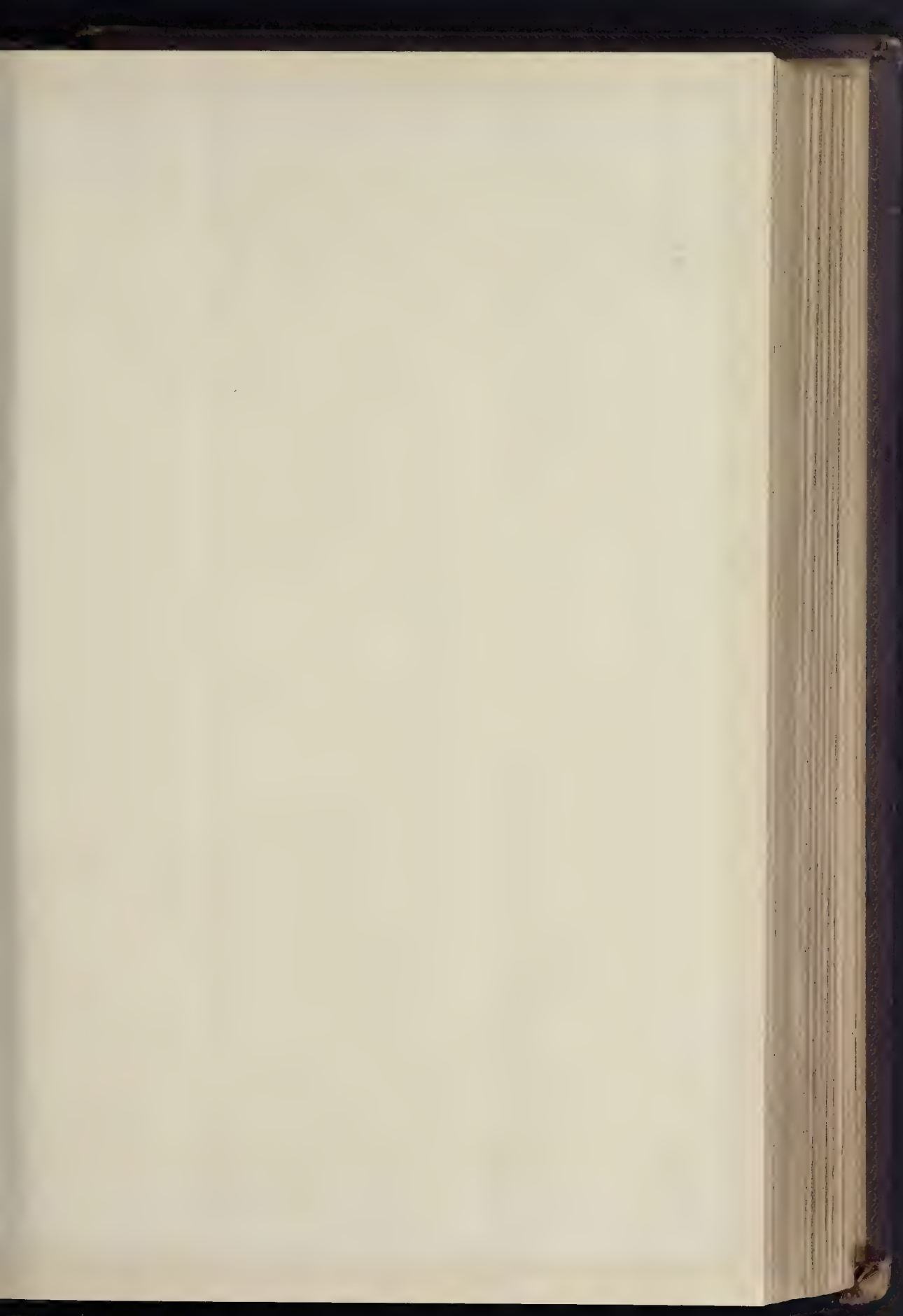
The *Antiquary* (which is reduced in price from 1s. to 6d.) is continued in nearly its old form but gives much more attention to illustration than before, especially in an article on "Ancient Book Bindings" (a review of two works on the subject). Mr. Cripps contributes an article, with an illustration, on a pre-Reformation chalice recently discovered. A sixteenth-century knife with a grace engraved on it, words and music, is the subject of another illustrated article. Under the heading "St. Dunstan's in the East" is a reprint of a very long inventory of the church plate and other possessions in the year 1550.

The *Atlantic Monthly* contains an article which may interest some of our readers, though it is not within the line of architectural subjects, "The Symphony," illustrated by an analysis of Beethoven's C minor symphony. The article is a good and thoughtful piece of writing.

The *National Review* includes an article on the

* The object of these notes is to point out anything in the contents of the current magazines which is of special interest to our readers, with occasional brief criticisms on the views expressed in such articles. When a magazine which has been sent to us is not noticed, it is because that number contains nothing that it is within our province to comment upon.

* The *Studio* is published on the 15th of the month, and hence reaches us just too late to be included in our notes of other magazines of the month.





FACADE OF THE NEW OPERA HOUSE.



ate Sir Chas. Newton, by Mr. Stanley Lane Poole, than whom no one, probably, is more competent to speak as to the work and the character of Newton. We gather from the article that the keeper of the Greek Marbles was more popular in society than among the *employés* of the Museum, to whom he was a somewhat rigid disciplinarian. He may have been none the less fitted for his post by that quality.

In the *Westminster Review* Mr. Matthew Stobart asks for "A Newer Trades Unionism," the object of which should be to deal with the artisan himself rather than with his wants; to be a moral influence in building up his character. This is a pretty large demand, but certainly a wholesome one. In the same review Mr. J. J. Davies writes on "The Struggle for Healthy Schools," both primary and public schools; and in regard to the latter suggests that the headmasters have enough on their shoulders without being required to look after the sanitation of their schools, and that this should be placed under the care of responsible sanitary experts appointed by the Local Government Board; a suggestion which has been made in our own columns, at least so far as that there should be periodical inspection by sanitary experts appointed by the State.

In the *Nineteenth Century* Mr. H. A. Kennedy draws attention to the precarious state of the paintings in Pompeii, which have suffered more than usually of late years from several severe frosts, and some of which he expects will be gone in three or four years unless some steps are taken to arrest their decay. An attendant said to him on the spot, "These should be in England, where you are rich enough to put them under a roof." But then we should have Mr. Frederic Harrison and his friends down on us, who wish that England had left the Parthenon marbles to go to decay where they were. As Mr. Kennedy observes, the Pompeian paintings, being practically Greek, are of specially interest as giving us the lighter and more humorous side of Greek art.

In the *Century* the "Old Dutch Masters" series consists of a short notice of Govaert Flinck, by Mr. Timothy Cole, with an engraving by the author after one of Flinck's pictures ("Portrait of a Young Girl"), an excellent specimen of pure wood-engraving. "The Armour of Old Japan" is the subject of an article by Mr. M. S. Hunter, with some illustrations of this curious and interesting department of *bric-à-brac*. Mr. Maxim gives a description, with illustrative diagrams, of his flying machine (which, however, has not flown yet).

In *Harper*, Mr. Julian Ralph's article on "Charleston and the Carolinas" gives a great many sketches of old residences and town-halls, &c., which add to the interest of an article containing a good deal of local history. "Fuji-san," the Japanese mountain, is the subject of an article by Mr. Alfred Parsons, with eighteen illustrations from his pencil.

In *Scribner* the serial article on "American Wood Engravers" deals with the work of Mr. Henry Wolf, illustrated by small specimens of his engravings; work shaded in pure and delicate tone, which is a joy to the eye. Miss Edith Vharton's article on "A Tuscan Shrine," gives an account of the little-known terra-cotta sculptures at San Vivaldo, with illustrations of several, with some remarks as to their style and probable date.

The *English Illustrated Magazine* includes an article of considerable interest to our readers, on "Historic London Houses," by Mr. Philip Norman, illustrated by himself. The houses illustrated are: chomberg House; Bourdon House, Davies-street; Scarce House, the Library in Chestered House, and some painted medallions by Angelica Kauffman in Sir John Leslie's house.

The *Pall Mall Magazine* includes an article by Mr. Thos. F. Plowman on "The Aesthetes," a sketch of the history of what is called the æsthetic movement in modern English art, with a good many illustrations, including the reproduction of some of the illustrations to the short-lived publication the *Germ*, started as the organ of the pre-Raphaelite brethren.

In *Temple Bar* a series of "Letters from a French Atelier," by a girl student, give pleasant and well-written impressions of life in Paris, with special reference to the study of art.

Le Monde Moderne is a new French illustrated monthly which seems to include a very large range of subjects; archaeology, story-telling, commerce, scientific invention, &c., &c. The first number is an interesting one, and the article on some Egyptian explorations—"Les fouilles de Bahchour"—is well illustrated.

We have received No. 16 of the republication of *Punch* pictures, which is still in progress, and as interesting as ever.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE following is a list of the Royal Institute of British Architects' prize-winners for 1894-95:—

THE ESSAY PRIZE (eight competitors).—Subject: The Influence of Literature on Architectural Development. The Institute silver medal and twenty-five guineas was awarded to Mr. A. T. Bolton, A.R.I.B.A., 2, The Sanctuary, Westminster, S.W.; the sum of ten guineas to Mr. G. L. Sutcliffe, A.R.I.B.A., Heptonstall, Manchester; and certificates of honourable mention to Mr. J. Humphreys Jones, B.A. Lond., A.R.I.B.A., 94, Dalston-lane, N.E., and to Mr. Alfred C. Houston, A.R.I.B.A., 13, Furnival's Inn, E.C.

THE MEASURED DRAWINGS PRIZE (seven competitors).—A silver medal and ten guineas awarded to Mr. W. Henry Ward, A.R.I.B.A., 18, Lyndhurst-road, Hampstead, N.W.; and a medal of merit to Mr. John H. James, 14, Romilly-crescent, Cardiff.

THE SOANE MEDALLION (eighteen competitors).—Subject: Design for a Gallery for the Exhibition of Pictures and Drawings. The medallion and roof, under conditions of foreign travel, awarded to Mr. Hubert S. East, A.R.I.B.A., 110, Harbut-road, St. John's Hill, S.W.; and a medal of merit and 5*l.* each to Mr. C. H. B. Quennell, 44, Foxley-road, North Brizon, and Mr. Hay Jeffries, A.R.I.B.A., 37, Maitland Park-road, Haverstock Hill.

THE TITE PRIZE (eleven competitors).—Design for a garden pavilion. Certificate and, under conditions of travel in Italy, £30 to Mr. R. Shekleton Balfour, A.R.I.B.A., 76, Inverness-terrace, W.; a medal of merit to Mr. Banister F. Fletcher, A.R.I.B.A., 29, New Bridge-street, Ludgate-circus; and certificates of honourable mention to Mr. William Tait Conner, A.R.I.B.A., 9, Scott-street, Garnethill, Glasgow, and Mr. D. W. Kennedy, A.R.I.B.A., 14, Richmond-crescent, Barnsbury, N.

THE GRISSELL MEDAL (eight competitors).—Design for an independent wooden spiral stair. A gold medal and ten guineas awarded to Mr. J. Fred. Fogarty, B.E., A.R.I.B.A., 2, St. Peter's-terrace, Bourne-mouth.

THE PUGH STUDENTSHIP (seven competitors).—A silver medal and 40*l.* to Mr. J. A. Russell Inglis, A.R.I.B.A., 2, Great Coram-street, Russell-square; and certificate of honourable mention to Mr. C. C. Brewer.

THE OWEN-JONES STUDENTSHIP (two competitors).—A certificate and 50*l.* to Mr. J. J. Joass, for travel and study of colour as a means of architectural expression.

THE GODWIN BURSARY (one entry only).—A medal and 40*l.* for travel outside the United Kingdom awarded to Mr. A. W. Cleaver, A.R.I.B.A., 54-55, London-wall, E.C.

ARCHÆOLOGICAL SOCIETIES.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—On the 2nd inst. a meeting of the British Archæological Association was held, Mr. R. E. Way in the chair, when Mr. Councillor Lukey exhibited a photograph of an arched recess which has just been discovered at Canterbury. Mr. Loftus Brock, F.S.A., described the discovery, which has attracted a great deal of local attention since the remains have been stated to be of Roman date. The site is in the rear of the Old King's Head Hotel, at the junction of Stroud-street and High-street, where Mr. Lukey is erecting a new hotel. A crypt was found, arched with a segmental roof, the recess shown by the photograph being in its east wall. The building is of Norman and not Roman date. Many interesting fragments of fourteenth-century stonework were found in the excavations, which Mr. Lukey will preserve. The Chairman exhibited a collection of Roman fragments which have been found on the site of the old hostelry, the "Blue-Eyed Maid," Southwark. The inn is so called in the Elizabethan map of the district. Many piles were found in course of the excavations. A Roman villa appears to have previously stood there, since one of the objects exhibited was a hypocaust tile for warming purposes. Mr. de Gray Birch, F.S.A., exhibited a series of facsimiles of ancient Welsh documents as an introduction to a lecture by him on the subject. Mr. Loftus Brock described some of the structural features which have recently been un-

covered in the Great Roman Villa now being excavated by Mr. George Payne, F.S.A., at Darenth, Kent.

ARCHITECTURAL SOCIETIES.

YORK ARCHITECTURAL SOCIETY.—Mr. H. Perkin, F.R.I.B.A., presided on the 5th inst. at the annual dinner of the York Architectural Society. In his address, the President remarked that as to the repairs that were constantly needed to the exterior of the Minster, it would appear from the decay into which it was falling that the funds were quite inadequate for efficient renovation. He asked if it was not competent for that society to make a representation to the Dean and Chapter suggesting that they should make a supreme effort to obtain the necessary sums required for the next twenty years or so. If a further appeal were made, some large-hearted Churchman would respond with substantial help, as in the recent case of Peterborough Cathedral. Mr. Perkin was re-elected President.

MANCHESTER SOCIETY OF ARCHITECTS (INCORPORATED).—On the 8th inst., Mr. E. A. Claremont read a paper before this Society upon the subject of electric lighting. The chair was taken at 7.30 by Mr. John Holden, the President. Mr. Claremont described the principle upon which dynamos of various kinds are constructed, and the methods of distributing electrical energy from them, and especially comparing the high and low-tension systems and their various advantages and disadvantages. He expressed an opinion that the demand for electro-motors would, within the next few years, increase enormously, owing to it having been lately clearly demonstrated that in works where steam-power is, for driving purposes, transmitted long distances, and sub-divided by the use of many small engines, considerable economy in coal can be effected, sometimes even to the extent of 50 per cent., by the use of electro-motors, which not only avoid the enormous loss caused by condensation, but are also so convenient to manipulate that they permit of the energy being absolutely cut off when the motor is at rest, the speeds being variable, and at any variation remaining constant, irrespective of the load, and by means of simple instruments the horse-power required in each case being from time to time demonstrated, and he considered that the economy effected by such a system would be so great as in many instances to save the expenditure of the plant within a few years of purchasing. Mr. Claremont compared the various forms of electrical accumulators now upon the market, and showed the application of a number of small electrical appliances, and by means of diagrams and samples, illustrated the ill-effects likely to arise through inferior workmanship in electrical matters generally. The inverted arc lamp shown was particularly interesting, as was the explanation given of its lighting by reflection from the ceiling without the hitherto inconvenient glare attached to such appliances.

SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.—The ordinary meeting of members was held at the School of Art, on Tuesday, the President, Mr. E. M. Gibbs, in the chair. Mr. Henry Longden, of London, gave a lecture on "The working of wrought-iron from a practical point of view," which was illustrated by specimens both of finished work, and of forged iron work in process of manufacture. He first dealt with the qualities of wrought-iron, as for example, its strength, lightness, and comparative cheapness. The process of forming the parts of iron railings and gates, and of forming scrolls, twists, and leaves, hammered work of iron, were then dwelt upon. Some old examples of the use of iron railings were referred to, and suggestions were made as to the best effect to be got in the designing of railings. The lecturer showed some examples of carving in wrought iron, a difficult art, and one which, he said, should only be employed sparingly. Specimens studied from old Venetian work, and of modern work now in process of execution, were shown. The works of Mr. Sedding, the architect, were referred to, and it was named that some of his work, executed in Sheffield, may be seen in St. Matthew's Church. Some general remarks as to the present larger use of wrought-iron work were made, and it was urged on the meeting that only work of a fine, workmanlike, and characteristic order of design and execution should be used.

GLASGOW ARCHITECTURAL ASSOCIATION.—The general monthly meeting of this Association was held in the rooms, 114, West Campbell-street, on Tuesday, the President, Mr. A. N. Paterson, in the chair, when Mr.

Wm. J. Blaine read a paper on the "History of Monumental Buildings." Dealing with the origin of these buildings in the Pyramids of Egypt he traced the development of the square tomb through Assyria to Greece, and described the sepulchre of Mausolus at Halicarnassus. He followed the round tomb from the tumuli of Asia Minor through Etruria to Rome, and showed cause for the decay of this form in the introduction of Christianity in the seventh century which discouraged the idea of the secular tomb. During Medieval times the tomb was part of and was absorbed in the cathedral, and it was not till after the Reformation that owing to the revival of interest in Classic art this class of building came again into favour. After acknowledging the pre-eminence of French architects in the design of national trophies, the lecturer proceeded to describe the national monuments of Germany, pointing out the lessons that were to be derived from that country in the patriotic grandeur of their public monuments. The folly of crowding our churches with incongruous statuary was out of all taste, and Mr. Blaine advocated the erection of both national and municipal monumental buildings for the reception of the statues of our great men. Our larger cities could well afford to acquaint their citizens in this way with a sense of their own greatness, and of the devotion, courage, and intelligence which had gone to build up their name.

Illustrations.

THE PROPOSED NEW OPERA-HOUSE FOR ST. PETERSBURG.

THE Imperial Theatre Department of Russia at present manages six theatres, four at St. Petersburg, and two at Moscow. The seventh and grandest, of which we give the design, was just to be taken in hand before the late Czar's death. It remains to be seen if Nicholas II. will now take up the matter and carry out the work as a monument of his deceased father, whose intention it had long been to make the building a memorial of his reign.

It may be of interest to state that there are seven distinct companies of actors at the Czar's disposal, and seven orchestras, of which two have 100 musicians each, two sixty-five each, and the other three together are 100 strong. One of the great costume-stores alone holds 135,000 costumes and 20,000 pieces of armour. There is a dramatic library of 65,000 volumes, and an opera library with nearly 3,000 operas complete in every detail. The dramatic college is practically a boarding-school, with some 125 pupils, and the stables of the department have a complement of 100 horses. The resources are simply enormous, and the staff is literally an army.

The site for the proposed Opera House is on the Champs de Mars. The block is to face the River Neva, and the back of the block is to serve as a grand stand for distinguished visitors who attend the Czar's great military spectacles. As to the size of the proposed block, reference to a diagram on page 429 of our last volume will show its relation to other important Continental theatres.

The building is intended for the Czar's own use, for the Imperial Household, Government office-holders, and to a certain extent for the general public. The Czar either visits the opera in State or privately. In the latter case His Majesty uses a box to the left of the proscenium opening, on the first tier, in connexion with which is a suite of reception and retiring rooms, a private staircase, vestibule, and *porte-cochère*. The Czar does not enter any other part of the building when his attendance is "private." The audience consist of the favoured ticket-holders, and the general public which has to pay for admission. With the exception of the Czar's private apartments, and some suites for the dignitaries, the front of the house is practically entirely at their disposal. On State occasions the admittance to the building is only by special invitation. The Czar uses the central box and is in the midst of his guests. The grand foyer serves as His Majesty's reception room, and the main entrance and grand staircase are reserved for the approach of the Imperial party.

In order to fulfil the different requirements, the main entrance, central vestibule, and grand staircase have been so planned that they can easily be cut off without interfering with the approach to

the various parts of the building by other entrances. There are two rows of entrances on either side of the main portico. One of these in each case has a small *porte-cochère*. There is ample vestibule accommodation, and numerous lobbies with double and treble sets of doors have had to be arranged for on account of the rigorous winter climate. When the main entrance, with its grand *porte-cochère*, is not reserved for the Czar, the visitors to the better parts of the house can reach their seats either by this central approach or by the two entrances with the minor *porte-cochères* referred to. If the main entrance is cut off, of course the two side entrances only remain. The grand staircase from the main entrance ends in the *foyer* of the first tier. Two minor grand staircases off the side vestibules, in connexion with the small *porte-cochère* entrances, run as far as the second tier. Three entrances on either side of the main vestibule are for the visitors of the third and fourth tiers. These have their own respective staircases, arranged concentric with the back wall of the auditorium on what is known abroad as the "radial system."

The general disposition of the interior will be seen from the plans.* The auditorium measures about 100 ft. at its widest part, and is some 90 ft. high. It is planned to hold an audience of 2,100 in a most luxurious manner on *fauvel* seats. With a somewhat less luxurious arrangement of the seats and gangways there would be room for an audience of 2,800. According to the present plans there are over 600 seats on the floor level, and some 600 on the fourth tier. There are together sixty-four seats in the Czar's and the Lord Chamberlain's boxes. The orchestra-well is planned for 150.

The stage measures 100 ft. by 130 ft., and is about 130 ft. high; the rear stage is 100 ft. deep and 65 ft. wide. The stage machinery will be worked by hydraulics, on the Asphaleia system. There is ample accommodation for the artists both in dressing-rooms, *foyers*, and practice-rooms. For the members of the chorus, and "supers," dressing-rooms have been planned on dormitory system, with cubicles. There are several of these dressing-rooms, 65 ft. long each. Of dressing-rooms there are several 65 ft. by 30 ft. Special care has been taken to provide ample staircase accommodation. In case of fire there will be a system of sprinklers over the stage, as at Budapest, and a number of hydrants, which can be worked from passages outside the stage, have been arranged for, as at Vienna. Iron curtains will be put up between the auditorium and the stage, and between the main stage and the rear stage. Besides the usual water-service from the mains, there will be a pumping-station in the building, drawing water direct from a well, and reservoirs over the four staircases, at the corners of the stage, about 150 ft. above the street level.

Large stores have been planned on a most extensive scale, and the main semi-circular store is a special feature of the plan. The circular plan lends itself particularly well to the requirements of a stage with constant change of play-bill. This is the first time it has been proposed, and it is, of course, only possible where space is no object. The stores will be worked on the same principle as the locomotive sheds on our railways. The only fault that can be found with the stores, is the absence of sufficient isolation from the stage—of course it is another question if stores should be allowed at all to a theatre, on account of the extra risk of fire, and it seems rather imprudent to allow them in so costly a building—of course the wear and tear of scenery being moved out of the building every day would be enormous, but at the same time the proximity of the enormous quantity of highly-inflammable material, may mean the complete destruction of the building, not to say loss of life.

The back of the block is entirely taken up by some spacious halls for the theatrical library and a dramatic museum, around which are grouped the grand stands for watching the military spectacles on the Champs de Mars. The museum and library have two spacious staircases on either wing, and these lead on to the roof, which can also be used for spectators on parade days.

The latest improvements of ventilating, lighting, &c., will be introduced. Herr Lautenschlaeger, of the Munich Opera House, acted as consulting engineer for the arrangements of the

stage, and many other well-known authorities have been called upon to assist the architect. As to the cost, no particulars have yet been given. E. O. SACHS.

DESIGN FOR A SMALL COUNTRY HOUSE.

THIS is a house planned with a view to occupation by a small family with two or three young children, and is intended for the neighbourhood of a town.

The study is cut off from the rest of the house by double doors and by the vestibule, which serves to keep the outer air from the hall, where is the principle stair, going to the first floor only, with large open landing. The drawing-room is a large room, and the dining-room is placed to receive the morning sun.

The nurseries (which are shut off from the chief bedrooms, and have their own water-closet and sink), can be approached by the back stair, which is continued up to the attic.

The materials are red brick and tiles, rough cast on the walls of the upper story, and parge-plastered in the gables.

The estimated cost is 2,400*l*.

AMBROSE M. POYNTER.

THE "BANQUETING HOUSE," KENSINGTON PALACE.

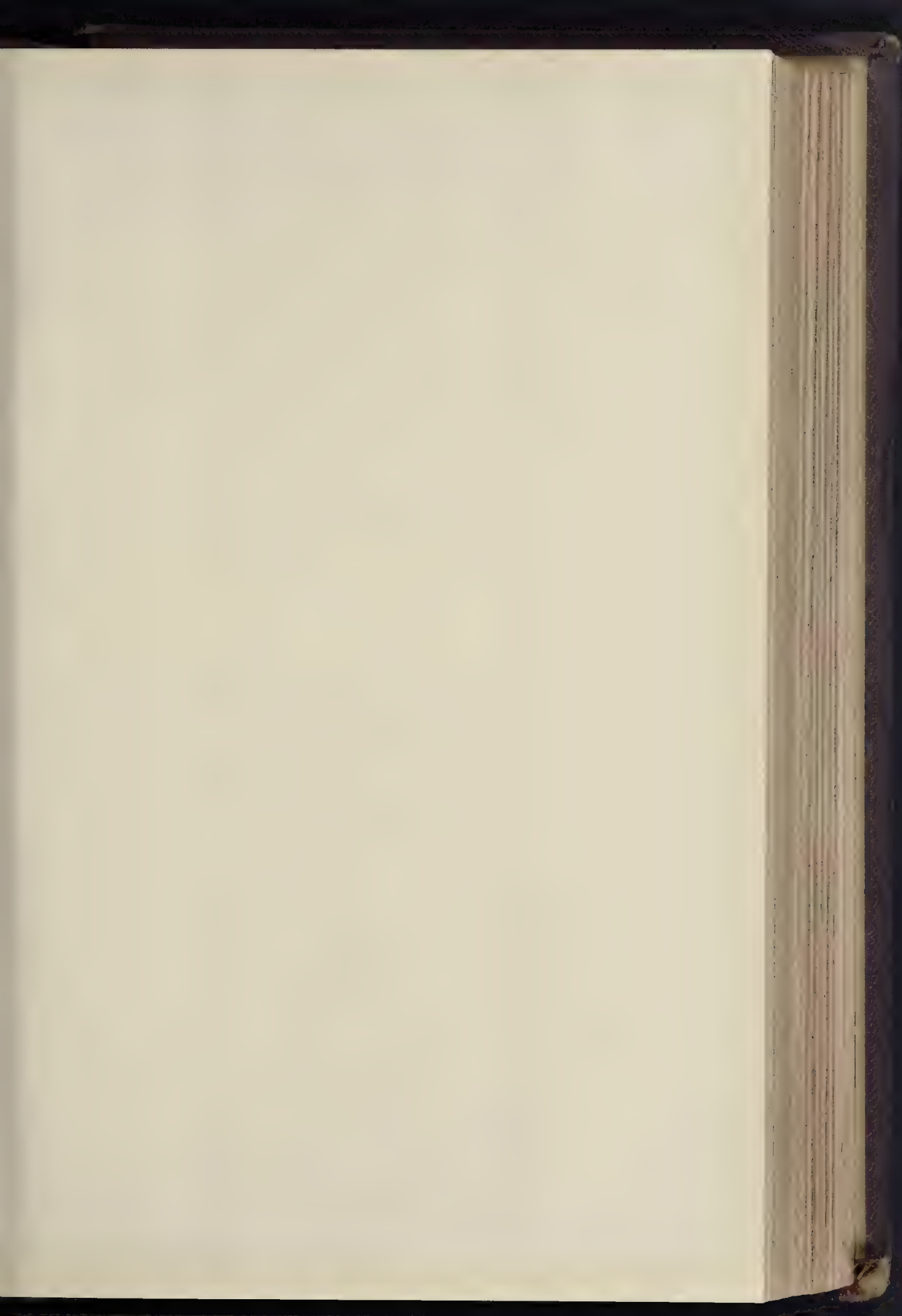
THE measured drawings of the building in connexion with Kensington Palace which was in recent times called the Oranvery, but was originally the Banqueting House or Concert-room (for it owned both titles), were made by Mr. C. Weald in competition for the Royal Academy silver medal for measured drawings of a building, the subject being selected by the Academy. Mr. Weald sent in certainly the best set of drawings, though another competitor was not far behind him. We are glad to have the opportunity to put them on record in our pages, as careful representations of a building which is believed to have been designed by Wren, and forms a portion of a palace which, though not imposing in scale or design, has its interest, both historical and architectural.

Kensington Palace has no tragic history; its plain, unpretending exterior well accords with its chronicle of the home and fire-side life of many members of our last three reigning houses. Standing in St. Margaret's parish, it is supposed to represent the manor-house of Neyte, belonging to Westminster Abbey, wherein Abbots Litlington and Islip died, John of Gaunt stayed for a while after the burning of the Savoy, and John, Richard, Duke of York's fifth son, was born. The palace site and private ground belonged, circa 1650, to the Coppins, of whom it was rented by the Finches. In 1662 we find it owned by Sir Heneage Finch, Lord Finch of Denbury, 1673, Lord Chancellor, 1675, and Earl of Nottingham, 1681, but at that time the cultivated land amounted to about 26 acres, lying mostly north- and south-west of the Palace. His son and successor, Daniel (who succeeded as sixth Earl of Winchelsea), the second of the "black funerals Finches," sold the property in 1689 for 18,000*l*. to William III., who narrowly escaped from a fire that on November 10, 1691, consumed most of the house which Evelyn described, February 25, 1690, as "altered, but was yet a patch'd building, but with the garden, however, it is a very sweet villa, having to it the Park and a straight new way through this Park."

The present palace consists of the Clock, Prince's, and Princess's courts, and two wings, the plan differing but little from Rocque's survey of 1736. For William III. Wren, helped by Hawksmoor as clerk of the works, designed the south-east block, which contains the Long Gallery where that king played with the little Lord Buckhurst as a horse for his toy coach. To Wren are attributed Queen Anne's Banqueting House, the subject of Mr. Weald's drawings, built, 1705-6 (*tests* Bowack), of brown brick, with red-brick dressings; and the alcove which formerly stood at the end of Dial Walk, abutting against the then Bath-road, and was lately re-erected near Marlborough (formerly Buck Hill) Gate, Bayswater-road. By the Banqueting House stand two gate-piers (capped with stone vases) of small red bricks beautifully laid. What we remember as an open lawn, in its front, has been taken into the garden,* where two large glass-houses ill harmonise with the House front. George II. used the Banqueting House for

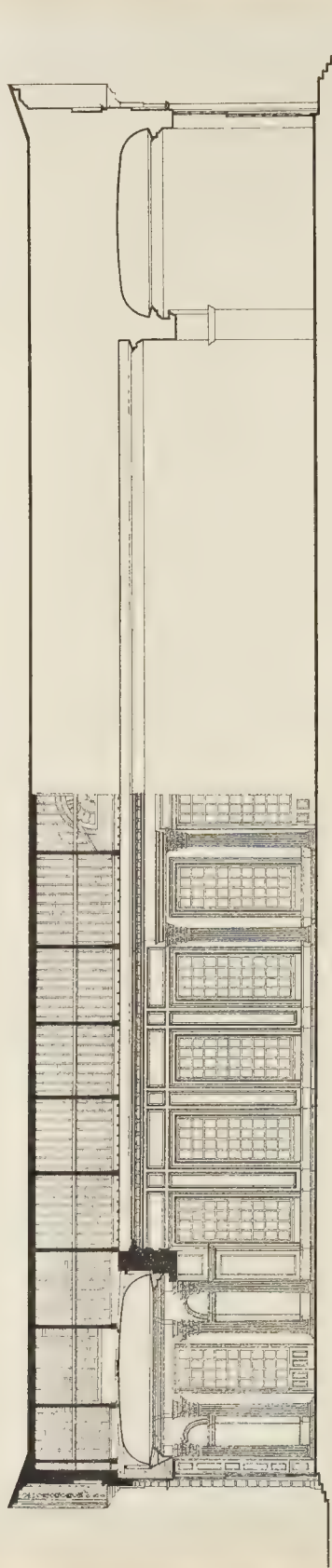
* It was intended to give two tolerably large scale-plans of the building with this account. By an unfortunate accident we have been prevented from the last moment from giving the plans in the present number, but hope to give them shortly, as they are of considerable interest.

* Sundry other parcels of land in the Gardens and parks have been enclosed of late years; the public did not always enjoy free admittance into the Gardens, however, and not long ago servants and dogs were excluded.

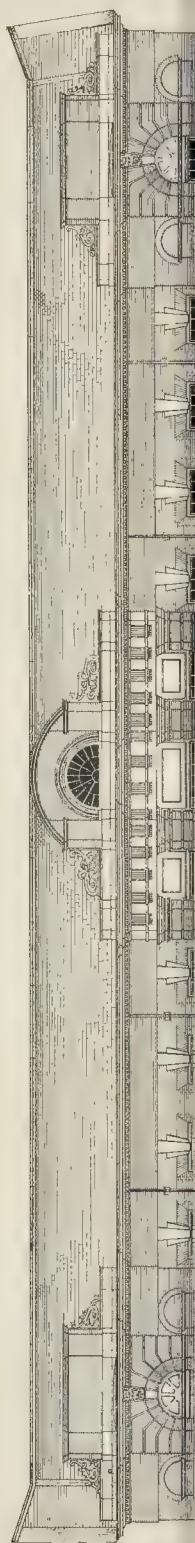


THE BUILDER JANUARY 12, 1895.

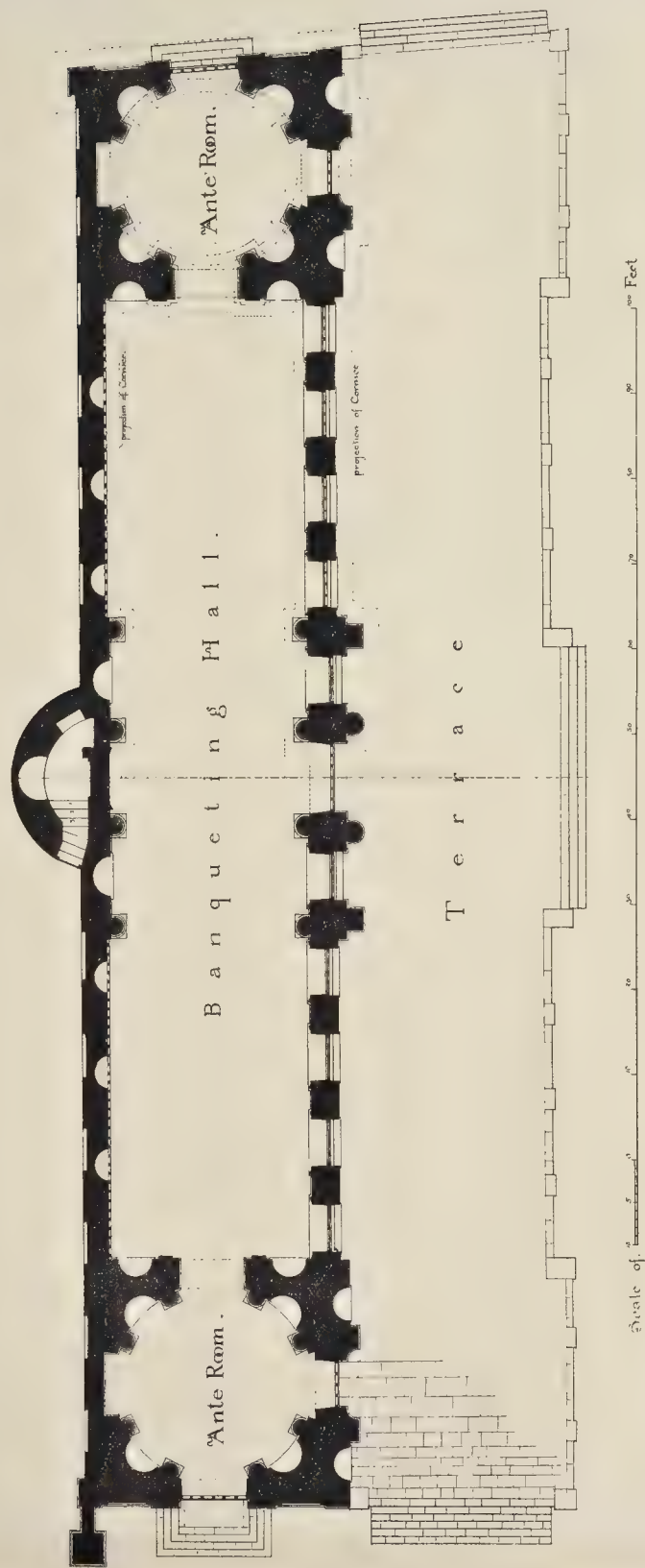
THE BANQUETING HALL. KENSINGTON GARDENS.



S E C T I O N



SOUTH ELEVATION



Royal Academy Silver Medal
for Meritorious Drawings, 1894

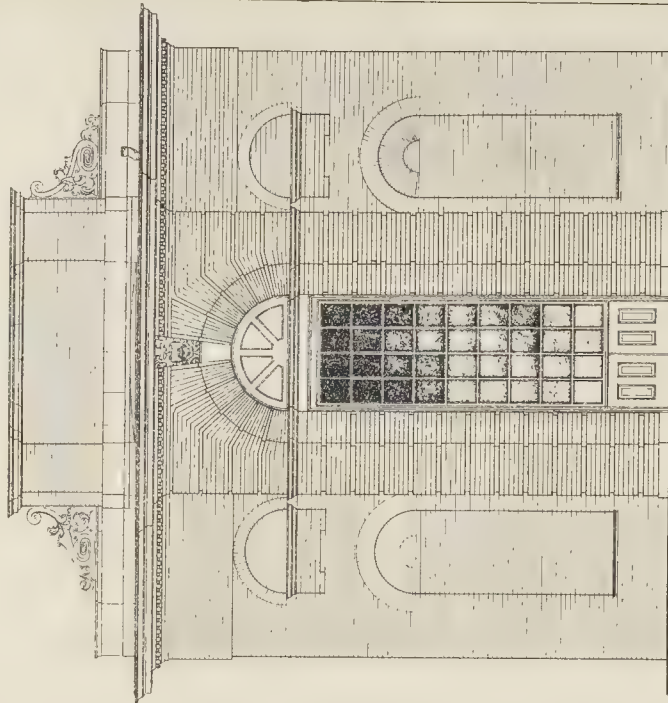
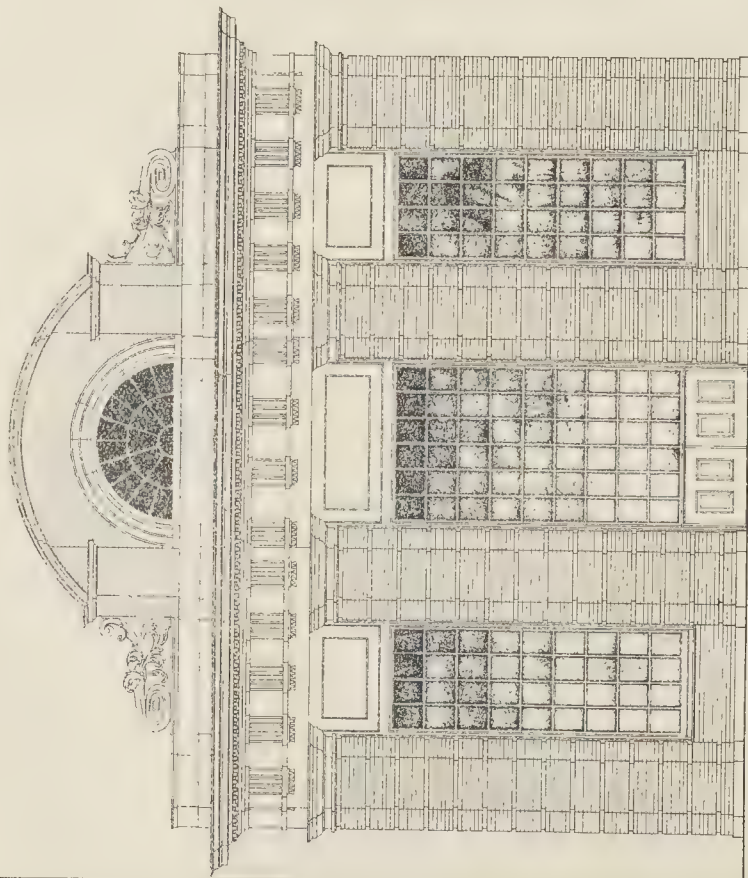
PHOTOGRAPHED BY MR. G. WEALD, 43 EAST HADFIELD STREET, LONDON, E.C.



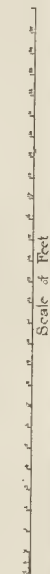
THE BUILDER, JANUARY 12, 1895.

THE BANQUETING HALL, KENSINGTON GARDENS.

MEASURED AND DRAWN BY MR. G. WEALD



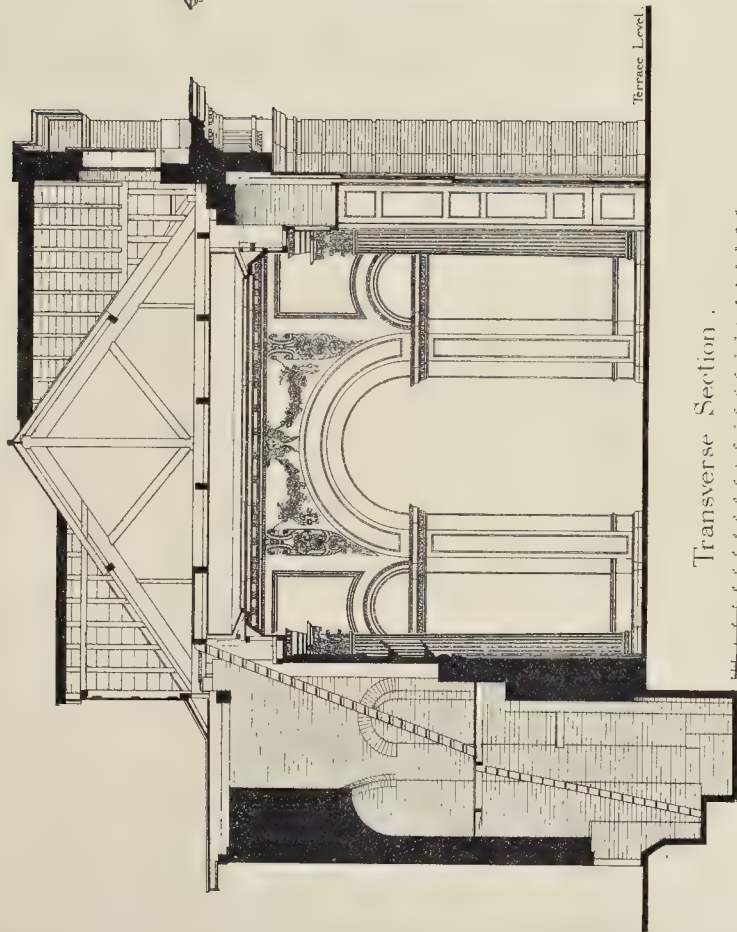
Central Bay



Scale of Feet

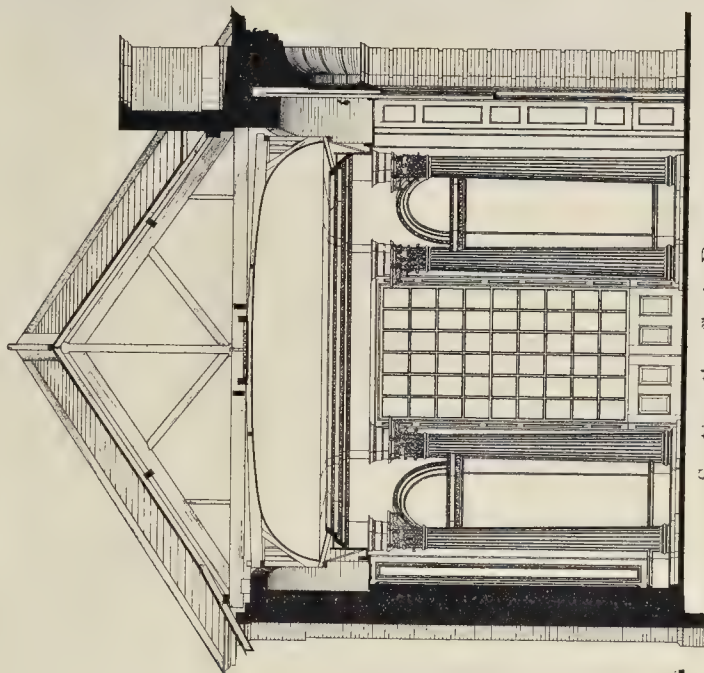
End Bay

THE BANQUETING HALL, KENSINGTON GARDENS.



Transverse Section.

Scale of Feet



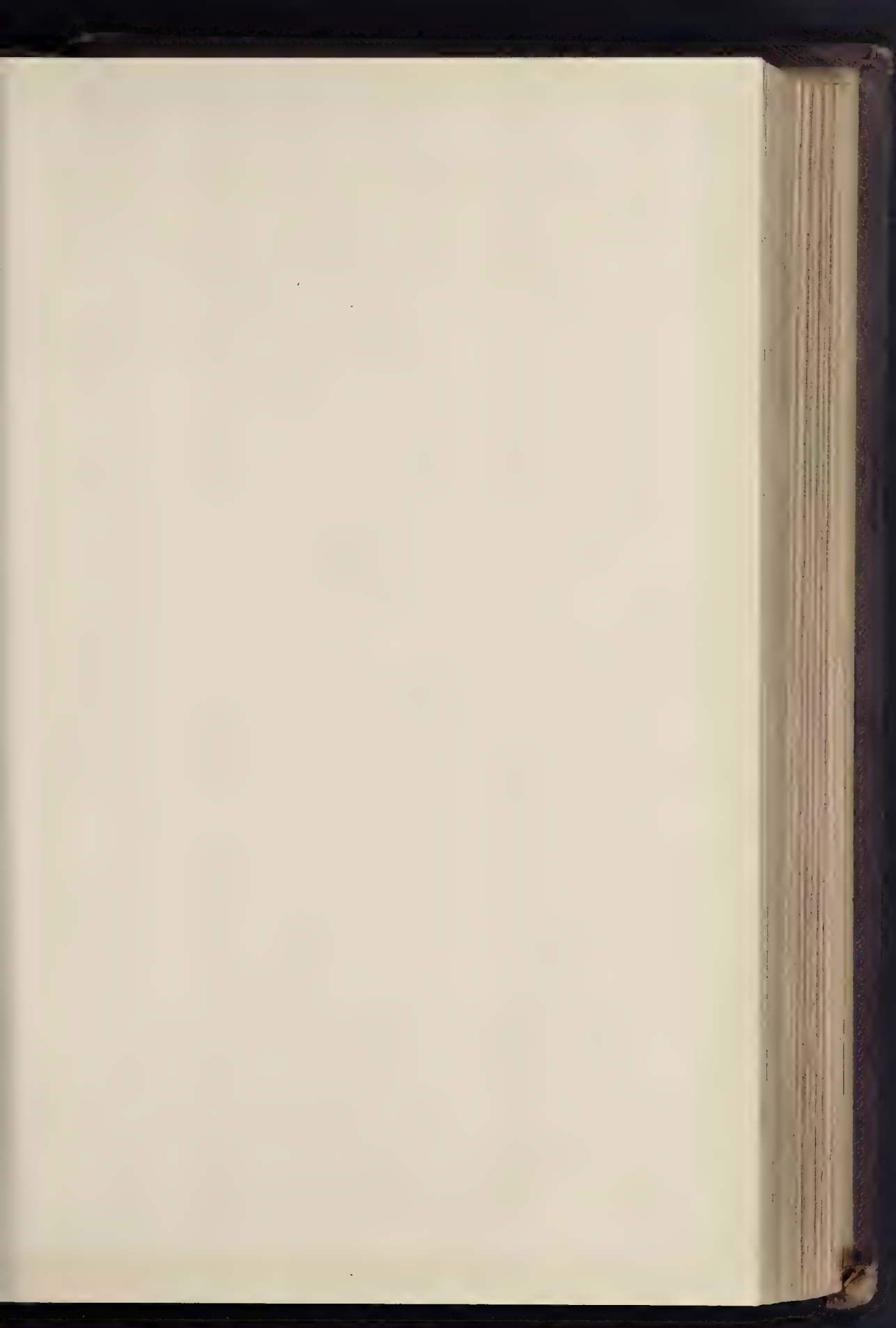
Section thro. Ante Room

Scale of Feet

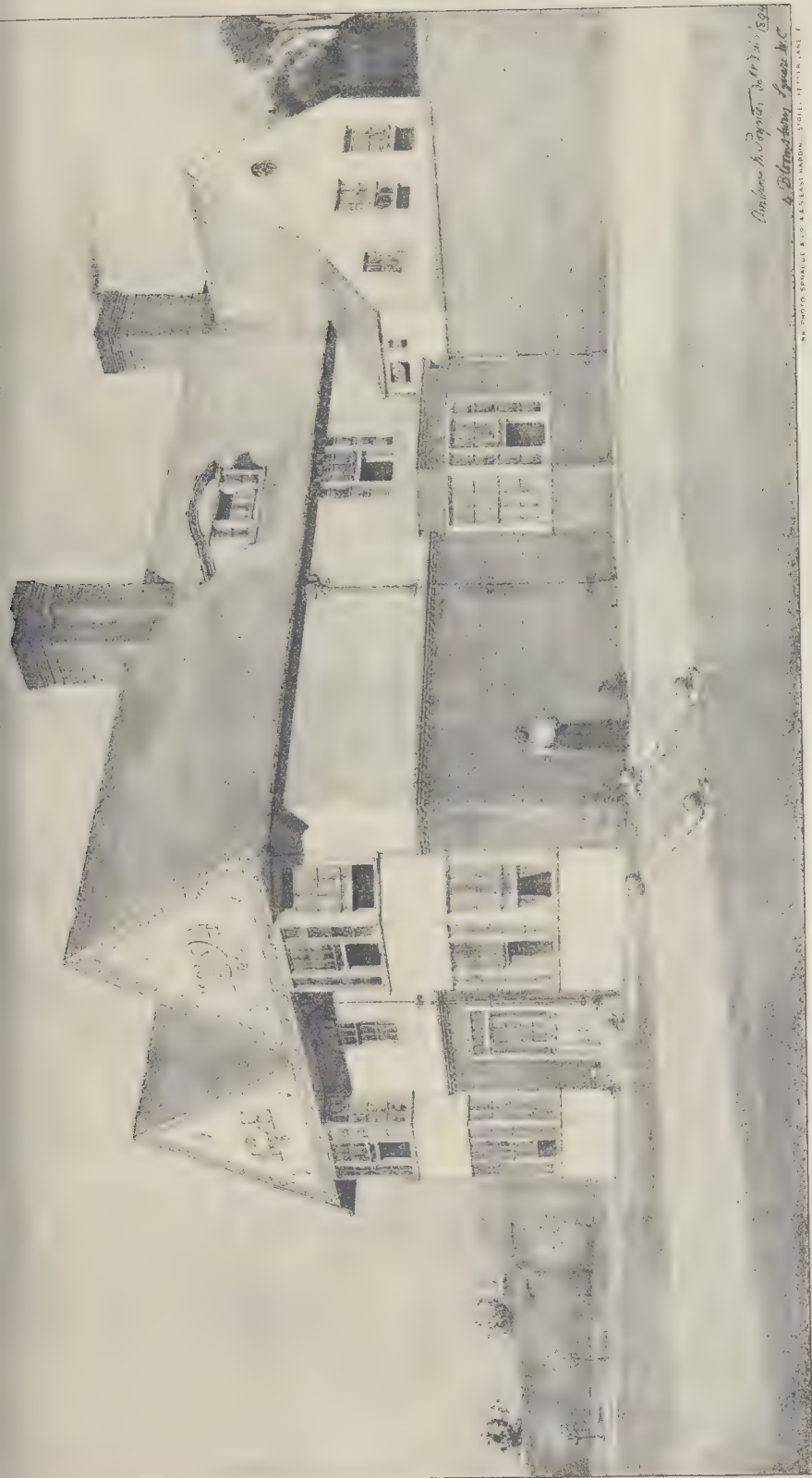
MEASURED AND DRAWN BY MR. G. WEALD.

PHOTO LITHO. SIMPLICIUS & CO. 48, & 50, EAST HEDDING STREET, LONDON, E.C.

Royal Academy Silver Medal
for Measured Drawings, 1894.





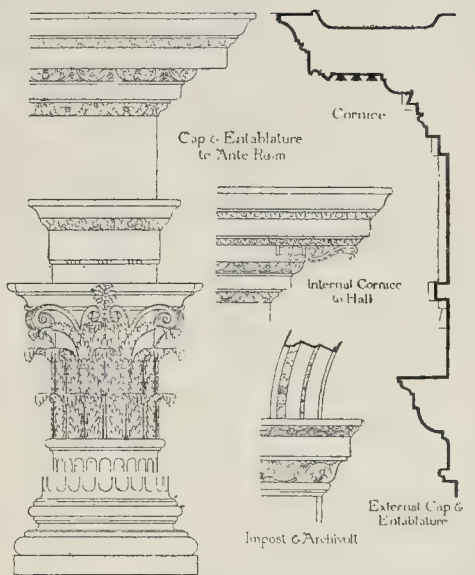
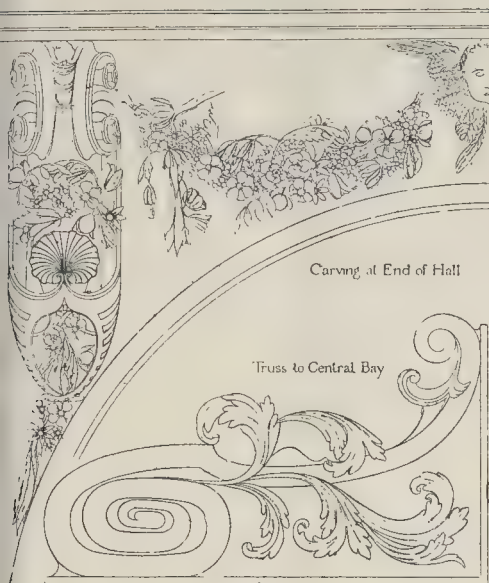


DESIGN FOR A SMALL COUNTRY HOUSE BY MR A M PONTIER

*Designed by A. M. Pontier, for Mr. J. H. Smith
in 1874*

AN PHOTO SPANISH AND EARLY HADON. STILL, ITTIN AND 1

THE BANQUETING HALL KENSINGTON GARDENS.



tubs of orange-trees; it has not received the careful treatment it deserves, and its stone surface is now disfigured with wooden plant-masses. The gate-piers (which correspond with those south of the Green) open on to the walk, and the former "Hog Walk," leading to the old gravel-pit Gate, along by the Wilderness, bounded the fine old yew-hedge, to whose wanton destruction we lately adverted.

Although we are only directly concerned here with the illustration of the Banqueting House itself, it may be of interest, and not out of place, to add a few further notes as to Kensington Palace generally. Hawksmoor made minor improvements there for Anne and her successor. In George I.'s reign Kent added the east block, with the pediment, the entrance corridor and staircase. His designs (1715-27) comprise the Cupola or Cube Room, and the West, Queen Caroline's and King's Great Drawing-rooms. These, together with the staircase, Presence Chamber, Apollo Room, and Admirals' Gallery, he painted and decorated: "employing the then newly-adopted Pompeian" style for the Presence Chamber ceiling, and placing gilt statues in marble niches in the Cupola Room. In the last-named is a marble bas-relief ascribed to Kysbrach. A lime-wood bordure over the chimney-piece of the Queen's Bedchamber, and carvings in the Presence Chamber and Queen's Gallery, are believed to be by Gibbons. Kent, with Bridgman, advised Queen Caroline in the planting of the many acres which, with her taste for taking and embellishing the parks, she added to the private grounds, and as pay as "master mason" included roof for his work at Kensington. To Caroline's instance is due the formation (1730-4) of the Serpentine into some pools in the course of the West Bourn—since diverted: the wall along the north side of the Gardens was replaced, by Loudon, with a railing. It is believed that the door bearing the monogram of W. and M. repeated, and other small portions of the palace north block, are relics of Nottingham House. On the Green, or the Moor, stood Vanbrugh's brick water-tower, designed in the broad castellated style, and, until twenty-five years ago, the conduit, having a vaulted roof, which Henry VIII. built circa 1536 for supplying water to Chelsea. The upper part of Palace-rudens stands on the site of the old kitchen-garden.

The Banqueting House itself keeps up the character which, to our thinking, belongs to so

much of the mansion and house architecture of its period, of being rather an architecture for internal than external effect. There is no doubt a certain degree of simple dignity imparted to the centre by the treatment of the brick piers as a kind of order; but the treatment of the end blocks is very weak and conventional, and the admiration which no doubt many will be ready at the present moment to bestow on it is to our thinking more the result of fashion than reason.

The interior, on the other hand, is admirably treated for interior effect; the two ante-rooms are very effectively planned; the row of long windows on one side of the room, with their panelled spaces between, and arrangement of niches for sculpture on the blank wall opposite the windows, all produce a whole which, when properly decorated as a large dining-room or *salon*, would be susceptible of excellent effect.

Correspondence.

To the Editor of THE BUILDER.

THE NEW DISTRICT COUNCILS AND THE PUBLIC HEALTH ACT.

SIR,—In your last issue you refer to a letter on the above subject, which appeared last week in the *Times*. I am obliged to you for supplying the proper legal terminology, as to which I see I was inexact.

The circumstances of the case to which my letter referred are these:—

The by-laws of the Wimbledon board contain the usual provision that "every person who shall erect a new domestic building shall provide in the rear thereof an open space exclusively belonging thereto, such space being free from any erection above the level of the ground except an asphalt." He shall cause such open space to extend laterally throughout the entire width of such building, and he shall cause the distance across such open space from every part of such building to the boundary of any lands or premises immediately opposite to or adjoining the site of such building to be not less than the height of such building."

In the case complained of, the owner and builder—the same person—has added at the back of an old house a considerable block extending quite across the back-yard belonging to that house, and reaching and abutting on the yard of a different occupier.

It is admitted, I believe, on all hands, that if

this addition is a *new building* in the sense of the by-laws it is illegal, because it does not reserve the necessary open space behind.

But the Local Board refused to interfere, on the ground that it is not a *new building* at all, because it is added on to an old one.

In London, as we all know, all additions, whether to old buildings or new, are treated as new buildings, and come under the operation of the Act. Of course, this does not bind Boards elsewhere, but it shows, I think, the intention of the Public Health Acts, on which all special Acts and by-laws are based.

A letter in the *Times* of the 3rd inst., however, from Mr. Langton Cole states that at Kingston, which is close to Wimbledon, all additions are treated as new buildings, just as they are in London, and are required to conform to the by-laws. Another correspondent tells me of at least one Rural Board, not very far from London, which does as Kingston does. I hope now that a correspondence on the matter has been started some of your readers will tell us what other Boards do. It is surely desirable that the rule should be the same in every place.

The explanation given by the Clerk to the Wimbledon Board in his letter to the *Times*, is, as your article points out, self-contradictory. He begins by laying down that an addition to an old building is not a new building, but goes on to say that this is a question of fact in every case. As a matter of fact the plans of the offending building at Wimbledon were submitted to the Board, which required some alterations to be made in the thickness of the walls, and the builder agreed to make them. Surely this was an admission that the Board possessed jurisdiction in the matter, and if they could order the walls to be thickened so as to comply with their by-laws, it follows that they could and ought to have insisted on the by-law concerning the reservation of open space.

The question, therefore, resolves itself simply into this: whether the Wimbledon Board or the Kingston Board is right in the meaning of a "new building?"

If the Wimbledon Board is right, and any owner of an old building in suburban and rural districts may add to it what he pleases and how he pleases, building insecurely, without any regard for the by-laws, using combustible materials, and blocking up the open space necessary for health and convenience, those who live among old buildings are in a pitiable case, and the by-laws which were, we may presume, intended for their protection as well as that of the speculative builder, are of no use to them whatever.

See the coloured views in W. H. Pyne's "Royal Residences," 3 vols., 4to, 1810; also his full account of the pictures, catalogued by West in 1818.

I venture to think that the Wimbledon Board is wrong, and that by revising and passing the plans in question they have admitted the jurisdiction which they deny.

The point seems to me a very important one, of far more than local interest, and one worthy of full discussion in your columns, affecting as it does everybody outside the jurisdiction of the Metropolitan and similar Acts, except those who are beyond the reach of any buildings older than the Public Health Acts.

I have not touched on all the points raised by your article, but must not at present encroach further on your space.

January 8, 1895.

THOS. G. JACKSON.

SIR,—In your last issue you criticise somewhat severely a letter I recently wrote to the *Times* (in reply to Mr. T. G. Jackson) on the above subject.

In my letter I said that everybody connected with local government law knew that an addition to an old building was not a new building, and that if an authority on the subject were needed it was to be found in the case of Shiel v. the Mayor of Sunderland.

I further said the question whether a given work constitutes a new building or an addition to an old building is a question, not of law but of fact, to be decided upon a consideration of all the circumstances of the case.

On this you remark, "the latter statement correctly lays down the law, but is opposed to the first observation."

On a careful reconsideration of my letter I am quite unable to see any inconsistency between my two statements.

If, as you say, they are opposed, and the second is correct, then the first must be incorrect. But is it?

Can an addition (properly so-called) to an old building be a new building? And is not the case referred to an authority on the subject?

You charge me with a "remarkable exhibition of confusion of argument," but in all courtesy I venture to think that the confusion is on your side.

I did not, as you seem to suppose, treat the same point first as one of law and then as one of fact.

What I said in effect is this: First, that as a matter of law an addition to an old building cannot be a new building; and next, that the law having thus distinguished between the two classes of work, and guided us to this extent, goes no further, but leaves us to determine as a matter of fact whether a given work falls within the one category or the other.

There are, of course, a few special cases where the Public Health Acts say this or that shall be deemed a new building, but those cases do not touch the general question with which alone I was dealing.

As many of your readers may not have seen my former letter, I will add that I was not referring to buildings in the Metropolis or in localities having special Acts.

"THE CLERK TO THE URBAN DISTRICT COUNCIL OF WIMBLEDON."

Wimbledon, January 8, 1895.

HEIGHT OF FUTURE BUILDINGS IN LONDON NEXT THE STREETS.

SIR,—I beg to thank you for the very clear reading of Clauses 47 and 49 of the L.B.A., 1894, given on page 476 of your issue of December 29, correcting myself and others, who had found in Clause 49 a different meaning. I have no doubt that your interpretation is correct. As, however, you have not mentioned one point to which considerable importance has been attached, I should be glad if you would do so.

The words of the Act (Section 49) are:—"Provided that any building erected or raised before the commencement of this Act to a height to which no objection could have been taken under any law then in force, although exceeding the height provided in this section, may be re-erected to its existing height."

Section 85 of the 1862 Act made it impossible that there should be a case, after 1862, in which the measure of height exceeded the measure of width in any street. The sentence in Section 49 of the new Act might, however, have been read as a saving clause, referring to the provisions of Section 47; but in that section there is a special paragraph in these words:—"This section shall not apply to the rebuilding to the same height as at present of any building existing at the passing of this Act of a greater height than 80 ft." Any excess of height beyond 80 ft. being thus fully dealt with in Section 47, it has been supposed that it would not again be referred to in Clause 49.

Any reference in the sentence quoted from Section 49 to anything after 1862 being thus impossible, and any reference to the extreme limit being surplusage, as that is dealt with in Section 47, it has been supposed by many that the sentence in Section 49 must necessarily refer to streets formed or laid out before 1862. It is argued that the provisions in Section 49 are not unreasonable, as the new legislation is mainly on the lines of the old, and any cur-

tailment of the old heights of old buildings is avoided.

The sentence in Section 49 was supposed to imply that:—"In a street less than 50 ft. wide formed before 1862 any building may be carried to the old height [but no higher], notwithstanding that the old height exceeds the measure of width of the street."

Thus building 40 ft. high, in an old street, 30 ft. wide could be 40 ft. high [but no higher] although the other part of Section 49 of the new Act would limit the height to 30 ft., where the old building was less than 30 ft. high, or where the site was not previously occupied by a building.

There is apparently something very doubtful, or there would not be so much discussion. Many would be glad if you would set all minds finally at rest.

AN ARCHITECT.

* * * We think the confusion only arises from not taking the words of Section 49 in their simple and obvious signification. The clause quoted is merely a general clause, like that in Section 47, providing that the action of the Act is not to be retrospective. In that sense it covers all cases, whether buildings erected before or after the 1862 Act. The latter Act also provides (by Clause 108) against retrospective application of its requirements, and in Section 85 it is implied that a building may be carried higher than the width of the street with the consent in writing of the Metropolitan Board of Works. Our respondent is therefore wrong in saying that the 1862 Act "made it impossible that there should be a case after 1862 in which the measure of height exceeded the measure of width of the street." There might be a case of increased height specially sanctioned by the Board of Works, or there might be a building erected before 1862 to a greater height, and still in existence. Both those cases would come under the category, in Section 49 of the new Act, of buildings to the height of which "no exception could have been taken by any law then in force," i.e. previous to the passing of the new Act. The clause is a general one providing against all possible cases of retrospective legislation; it has no special reference to the period before 1862.—ED.

ANGELS IN ART.

SIR,—The difficulty of satisfactorily designing an angel is great, and it can scarcely be matter for surprise that absolute success is rarely attained. Therefore, the artist who essays this task nowadays, is surely wisest when he adopts a convention which has been current for ages.

The wings, about which your correspondent asks his amusing questions, have always been accepted as the symbols of rapid motion, just as the nimbus has as the symbol of radiance. One does not regard either from the point of view of modern realism, but from that of symbolism.

Perhaps your correspondent would be good enough to point out how he would label an angel, so that his meaning should be clear to everyone who gazed, while the modern scientific sense should find nothing to carp at. The designer of such things would be glad of a hint on which to build up a new symbolism. Only a symbolism which is unintelligible (as most new symbols are), is useless, and the arts have ordinarily progressed by the vivifying of old forms.

My feeling is that it is entirely a question of design. That which uses the design is good, whether scientifically possible or not; and for mural decoration the lines which design must follow are those of bas-relief, with modifications caused by the difference of material, but the mystery which you, Sir, hint at in your paragraph is inadmissible. For pictorial treatment other canons are applicable, but the question now is a design for mural decoration.

I cannot refrain from suggesting that while such questions as your correspondent asks are, like a child's questions, easy to ask but hard to answer, they are not usually considered as evidence of the possession of wisdom or culture by the querist, who no doubt feels this, or he would hardly have selected the *nom de plume* of which he made use.

F. HAMILTON JACKSON.

SOME CURIOUS FEATURES OF PARISH CHURCHES.

SIR,—The idea of furnishing a list of curious pre-Reformation features in our parish churches is certainly an amusing one, and surely it is as good, the value of such a list that it should be strictly accurate; and it appears that, with regard to some churches with which I am more intimately acquainted, Mr. Littlehales has fallen into error, while other particulars given are misleading.

Taking Wiltshire first, and the Church of Bishops Canning's. A very brief examination of the so-called "confessional" is sufficient to satisfy anyone who will take the trouble, that it consists of portions of a fourteenth-century rood-screen, made up into a chair at a period long subsequent to the Reformation, and for purposes obviously very different from that of the "confessional."

Purton and Wanborough.—Neither of these churches has two spires as stated. Each has a spire between the nave and chancel (this in the case of Wanborough being so small as hardly to deserve the

name), and a western tower. These churches are fully described and illustrated in a paper by Mr. C. E. Ponting, F.S.A., in the *Wiltshire Archaeological Magazine* (vol. 23, page 220), who concludes his paper by the following reference to these features, and the absurd tradition which has been attached to them:

"A comparison of these two churches will at once show that their both having a spire at the east end and a tower at the west end of the nave is an accident so far as the earlier features—the spires—are concerned, or at any rate that there was no intention of making the one like the other. Purton has a central tower of ordinary construction, carried up directly from piers, and finished above the roof at a tower, and the spire placed within its parapet, whilst the corresponding feature at Wanborough is little more than a turret, resting on arches, not growing out of any direct support from the ground, and capped with a spire. They are, moreover, quite different in detail. It is curious, however, that the central feature makes it the result of a compromise between two sisters, founders of the church, one of whom wanted a tower, and the other a spire, the difference being happily settled by adorning the building with the favourite feature of each."

In Berkshire, the Church of St. Helen's, Abingdon, is described as having five aisles, but surely one of these is the nave.

The church at Fyfield was almost wholly destroyed by fire some twelve months ago.

"Norfolk: Walpole St. Andrew's Great bracket." This seems vague and misleading, as only those who have visited the church could identify the feature named with that on the south pier of chancel arch, and which has a staircase leading thereto. Dr. Cox says this is undoubtedly an ambo. Sketches of it were published in the *Antiquary* and the *Illustrated Archeologist*.

At Walpole St. Peter's, in the same county, the "stone canopies" stated would be more correctly described as "fan-vaulted recesses," there being no canopies at all to them. The passage-way is not under the choir, but under the sacrum.

I know that it would be easy to expand such a list as Mr. Littlehales gives, and I have no desire to be captious, but I venture to think that in some instances the value would have been increased by slight additions, notably where the octagonal vestry of Long Sutton Church, Lincolnshire, is mentioned. This is rendered distinct from the one at Enford, Wilts, by having a priest's room over, and I think is almost, if not quite, unique in this respect.

A. NEEDHAM WILSON, A.R.I.B.A.

* * * We accepted no responsibility for Mr. Littlehales's list; we merely consented to give it publication, as his.—ED.

SIR,—Under this heading Mr. H. Littlehales, in your issue for the 26th ult., quotes of "Devonshire: Exeter.—(St. Martin's) 'Not Martin's' recess. (St. Patrick's) Herse-cloth." There is, assuredly, no "recess" in St. Martin's. It is a small edifice, consisting simply of nave, chancel, and north tower. Close by the central approach, and opposite the tower in question, i.e. half way up the nave, on the north side, is a plain octagonal font of Purbeck marble, probably of fourteenth century date. It certainly has no "recess" upon or near it. But, on the south side of the upper part of the octagonal shaft, is a curious projection, shaped like a small stoup, with a hole in it, just as a stoup would have. This hole appears to communicate with the drain from the bowl. In the middle of this century this font seems to have stood beneath the north tower, to the south of which it now stands. In "Rough Notes of Churches in the Deanery of Christianite of Exeter," published in A.D. 1849 by the Exeter Diocesan Architectural Society, I read:

"The small north tower, the basement of which is fitted up as a pew, having within it a plain decorated octagonal font, with part of the mouldings cut away at the neck, and standing on a plain octagonal stem."

The author is even still more at sea as regards his second note. In the first place, there is no old (or new) church in the "ever-faithful" city dedicated to St. Patrick. The respective dedications of the old churches here, besides St. Martin's, are:—St. Mary Arches, All Hallows, St. John's, St. Stephen's, St. Peterock's, St. Laurence's, St. Pancras, St. Sidwell's, St. Mary's Steps, and St. Thomas. All the rest have been practically rebuilt in more or less modern days. If for "St. Patrick's" Mr. Littlehales means "St. Peterock's," there is certainly still no herse cloth existing there at the present time.

The late Mr. Robert Dymond, F.S.A., however, in his "History of the Parish of St. Peterock, Exeter, as Shown by its Churchwardens' Accounts and other Records" (1882), which is by far the most exhaustive story of St. Peterock's existing, tells us that one might have been seen there so late as Henry VIII.'s time, but this was probably in common with most other

parish churches. Here are the entries in question—
"1-2 Richard III., 1483-4 . . . a 'here' (herse?) cloth for the high altar 2s. 4d." The author's note on this is—"An interesting inventory of the church records is written on the back of this record. The 'here' cloth was perhaps a herse cloth. In different parts of the church, sometimes in front of the high altar, were herse or stages, decorated with palls, apers, &c., in memory of deceased great persons."
Again:—"10-11 Henry VIII. (1518-9). For linen to make a cloth called 'le herse cloth 2s."
That latter is the latest record we people in the West, who delight in old records, know of any herse cloth existing in the City of Exeter.
HARRY HEMS.

SIR,—There is an error, perhaps due to a misprint, in the list given in your last issue, under the heading "Devon." TAVISTOCK should be TAWSTOCK.
I know the churches at both places. That at TAVISTOCK stands on a level site, and the arrangement of the steps and floor levels inside presents nothing unusual. The church at TAWSTOCK (near Barnstaple) stands on the slope of a hill, the fall being from west to east. There are steps—two, I think—across the nave and aisles, in line with the first pier from the west, and a further descent of five or six steps from the nave, or rather central tower, to the chancel.
The church possesses a piece of furniture of sixteenth-century date, which seems to be a modern altar-table. The dimensions of the top are 5 ft. 6 in. by 1 ft. 9 in., the height being 3 ft. 3 in. The front and the two ends have close framing, the panels being of "linen" pattern. The back, or side towards the wall, is unenclosed, having no chancel-arch. It stood, when I saw it, in the south chapel.
There is also a canopied seat, locally called a confessional, but which was probably the squire's pew. This used to stand in the north transept, near the central tower, but is now, I believe, at the western end of the north aisle.
The parish church of Halax (Vorkshire) is built on a sloping site. Between the western doorway in the tower, and the cross-passage from the north to the south porch, there are two or three flights of steps, with spaces occupied by seats between them. From the cross-passage the floor of the nave and aisles slopes downwards without steps as far as the line of the chancel-arch. Here there is an ascent of several steps, the space under the eastern part of the church being used as vestries.
CHAS. R. BAKER KING.

VESTRIES AND DRAINAGE.

SIR,—Referring to your issue of December 22, 1894, wherein Mr. E. W. Hudson publishes an explanatory letter respecting some legal proceedings taken by a Vestry and County Council to enforce certain new ideas in sanitary work, I shall feel obliged if any of your readers could give me some information with respect to my case.
I own two houses in North London which have been built thirty years. The drains were laid and passed, I presume, by the District Surveyor at the time of building.
I have received a notice from the Vestry to ventilate soil-pipe, it being a "nuisance and danger" to public health. To take out 4-in. soil-pipes and replace them with 6-in. To take out 3-in. sink drain-pipes and replace them with 4-in. sink drain-pipes.
These pipes have during the last thirty years answered the purpose for which they were laid, and there is now nothing extra to be drained by them. What I wish to know is, am I compelled to do the alterations? If I refuse what will follow? Are the Vestry responsible to me for the cost of such alterations, either through the neglect of the Local Surveyor who passed them at the time of building, or now wishing to have the houses drained in accordance with their new ideas of to-day? My tenants do not complain, and are quite satisfied with things as they are.
The Vestry Authorities or the County Council want householders to continue to alter their drains as new ideas come up, surely they should pay or recompense the owner on whom they wish to practise with their new ideas.
Is there any society or association formed for the purpose of protecting householders? If not I think it is time such a society was formed.
G. SAMUEL.

*As to the powers of the Vestry, and the consequence of disobeying, those are legal questions which we cannot undertake to advise upon. But we pretend that our correspondent will find that the Vestry are acting within their powers, and that he cannot refuse to comply. As to what they actually propose to have done, the ventilation of the soil-pipe is probably beneficial and may be necessary; but the order to put 6-in. soil-pipes instead of 4-in. is entirely opposed to recent opinion and experience; so much so, that we rather doubt whether the statement is not a mistake on the part of our correspondent.—Ed.]

The Student's Column.

BRICKS AND TERRA-COTTA.—II.

ORIGIN OF CLAYS.

NO rock in existence is capable of entirely resisting the disintegrating effects of rain, ice, the mechanical movements of solid particles in running water, bombardment by the sea-waves, or the chemical action of many acids, simple or compound, free or in combination. These, as we know, are called, with others, the "agents of denudation." Even such proverbially hard rocks as granite and syenite yield in time to the unceasing action of some or all of these agents. One of the products of denudation is clay, from which bricks and terra-cotta are made. We know that many kinds of clay are involved in the manufacture of these. Let us endeavour, first of all, to search into the origin of the more important of these, and of certain raw materials also used, and closely allied to them. Then we shall better understand the actual nature of the earths themselves, and frequently be enabled to judge of their quality for specific purposes without having to go to the length of a more detailed scientific investigation.

We cannot do better in beginning than to treat briefly of the origin of the purest kinds of clay—those used in the manufacture of porcelain and the better kinds of pottery and terra-cotta. It may at once be stated that the most valuable of these is the pure white kaolin or china-clay, which occurs so plentifully in parts of Cornwall and Devon, and the pipeclays of the latter county, of Dorsetshire, and elsewhere. Kaolin is a hydrated silicate of alumina, but on the broad scale it frequently contains quartz, and to a small extent mica. It is not difficult to see the precise origin of the material, in the neighbourhood of St. Austell, in Cornwall, for example. We find it associated with allied substances, known as china-clay stone, and china-stone, and with granite.

Granite, then, is the original source whence kaolin was derived, and we may mention that the bulk of all other clays is composed of material either directly or indirectly obtained from granitic rocks. Mineralogically, granite is made up of a thoroughly crystalline admixture of quartz, felspar and mica; but in Cornwall and Devon it frequently contains also a mineral called schorl, a black variety of tourmaline. When the most powerful agents of denudation attack granite the latter is destroyed primarily through the weakness of its felspar. This mineral is a silicate of alumina, plus a little lime, soda, potash, &c., as the case may be. It is very prone to succumb to the influences of the deleterious acids in solution in rain and river water. The mica, also, is not a particularly stable mineral, and the same may practically be said to apply to schorl. The quartz, however, is very weather-resisting. On the decomposition of granite, therefore, the felspar is the first to become seriously affected, and this mineral forms by far the greatest proportion of the rock.

If we examine into the method of weathering of granite when used as a building-stone, we find that the decomposition takes place very slowly indeed, and is confined for the most part to the surface of the material, or not to more than half-an-inch in depth from the surface. This also holds good for many granites and granitoid rocks in the field, but it does not apply to many Cornish and Devonian granites, especially near St. Austell and near Plymouth, where large quantities of china-clay are raised annually. In the south-west of England we become aware that the granites are often decomposed not merely on the surfaces, but for many feet in depth. It would seem that there is some connexion between this peculiar underground decomposition and the general proximity of mineral lodes, though doubts exist as to the causes which have effected this alteration. These need not be inquired into here; it is sufficient to know the net result, which may be briefly stated as follows. The original substance of the granite has been very much changed, and is more or less rotten. The orthoclase felspar, often porphyritically developed, is no longer crystalline in nature, and appears in the china-stone as skeletons of its former self. The schorl is broken up into small sections, or has almost entirely disappeared. The mica is very weak; but the quartz is practically unaffected. In this condition the rock is sometimes known as carclazite, and may be sent direct, without preparation, to pottery works. It is, however, of but little value for use in potteries unless mica is entirely absent,

or is of exclusively white, non-ferruginous varieties, and there should be no schorl present.

China-clay, in its natural condition, is very much the same as china-stone, only that the decomposition has gone still further, the felspar being completely changed into clay. Nothing more is necessary for extracting the clay than the disintegration of the whole mass by water, by which the clay is carried away in suspension. This operation may have been performed by natural processes, or the water may be applied artificially. The deposits from which china-clay is obtained are very irregular in their occurrence. They seem to be portions of the various granite masses decomposed *in situ*, as we have already remarked, and they often cover a considerable area. Their extent in depth is unknown, but at Beam Mine,* and also at Rock's Mine, both near St. Austell, china-clay was found at a depth considerably exceeding 60 fathoms from the surface. In the rock from which the clay is obtained, the felspar, decomposed, exists in crystals of considerable size. To make this clay marketable, it is only necessary to break down the soft decomposed rock, and direct a stream of water over when the latter becomes at once thick with the suspended particles of clay and mica. The milky-looking stream is then guided into narrow channels called "micas," in which the current receives a check, and the heavier particles of mica are deposited. The clay is finally caused to settle in large tanks, or "pans," and afterwards dried, often by exposure to the air, but mostly by means of heated flues, or "drys," over which the partially-consolidated clay is placed for the purpose. As soon as the clay is dry it is ready for sale, being carted at once to the shipping ports in a loose state, or packed into barrels or bags for exportation.

The pipeclay so largely used in London and elsewhere is a form of kaolin removed a long way from its source of origin, at least so far as the deposits in the Isle of Purbeck are concerned; and these and those at Bovey Tracey in Devonshire are the most important in the country. It is rather remarkable that the clay in the Dorset area referred to should have been preserved so well; that is, to be so pure. The nearest granitic mass to it is Dartmoor, many miles off, and it is a wonder that during its translation it did not become mixed with more impurities. The following section† may be given to show how it occurs at the Matcham clay works, near Corfe Castle:—

- 1. Brick-earth and surface material.
- 2. Loose white sand, with iron-stone bands at the base 20-40 ft.
- 3. Stiff yellowish or variegated pipe-clay 30 "
- 4. Pure potters' clay 8 "
- 5. Lignite, or brown coal 2 "
- 6. Clay "

Bed No. 3, the yellow or variegated clay, is taken off in large oblong pieces, and left in the workings. Bed No. 4, the potters' clay, is the material really worked for; it is a soft, white, and somewhat unctuous clay, being very nearly pure kaolin.

We should now like the student to follow us a little further into the origin of clays, for we have not yet accounted for the ordinary brick-earths, or fire-clays. To make the matter as simple as possible it is necessary to remember that all streams and rivers coming away from a granite area like that on Dartmoor contain a fair proportion of clay in mechanical suspension. This clay is deposited at the mouth of the rivers, or may be taken by marine currents a few miles out to sea. In any case, not far from land the water drops its burden, and a deposit of clay accumulates. In the meantime, however, it has become mixed with various impurities, principally sand and ferruginous matter, so that if we could examine it we should find it was no longer kaolin. It has in fact now passed into a dark or ferruginous clay of the kind mostly used for making bricks; and this process has gone on during countless ages. Having been laid down in water, these thick argillaceous deposits have subsequently, by earth movements well-known to geologists, been raised into dry land. Many of these clay deposits are hundreds of feet in thickness. On being brought above the sea-level they were again subjected to the merciless action of the weather, again in part broken down, and re-deposited beneath the waves; and so the action has been going on almost ever since the commencement of geological time. It is not too

* Collins "Geologists' Association Visit to Cornwall," 1887, p. 29.
† "Geologists' Association. Record of Excursions," 1891, p. 322.

much to say that the particles composing many of the more solid clay beds used in brick-making have been alternately laid down, elevated into dry land, broken up and re-deposited twenty or thirty times since those particles were originally derived from the destruction of the felspar in the granite to which they owed their birth. They have been used again and again in building up past argillaceous deposits. It is only when freshly derived from the destruction of granitic rocks that they can possibly be pure.

Bearing these facts in mind, we have no difficulty in understanding the origin of clays. Some have been laid down off the sea-shore by the destruction of bygone cliffs containing much clay; others have been deposited in the estuaries of rivers; a third kind was formed in lakes; and a fourth in the quiet reaches of rivers or streams, or by the overflow of the latter above their banks. The student will perceive that brick-clays are, in the main, composed of hydrated silicate of alumina, plus some sand and any other adventitious mineral matter, &c., introduced into it at the time of deposition. They cannot, from their modes of origin, possess anything like homogeneous composition over wide areas, and herein consists the principal difficulty of the brickmaker.

At the same time, clays of marine origin are much more homogeneous, as a rule, than those of either lacustrine or fluviatile. Deposits in the quiet reaches of rivers, or in river-valleys, are always very thin, each stratum often not being more than a few inches, or a few feet in thickness at most. In such cases the section worked in the brickfield is frequently composed of several layers, each differing from the other. Some contain more sand than others, one or two may have a small proportion of lime, and so on. These are generally dug and mixed together, the net result being a product that is surprisingly uniform, even over several acres of land. It is characteristic of river deposits that they are very thin and local in occurrence.

In regard to fire-clays, they are usually found as "under-clays" of coal-seams, and are for the most part fluviatile in origin.

It must not be imagined, however, that the thick marine clays were always of precisely the same character as we now see them. In addition to changes which must necessarily have taken place on consolidation, we know that small crystals of gypsum (selenite) and some other minerals were developed. Very few compact clays exist in which selenite may not be found. Peculiar concretions known as septaria also make their appearance. When subjected to great pressure, thick clay beds assume a shaly or more or less fissile structure, and in consequence of great earth movements they are frequently turned into slate. The last-mentioned roofing material has taken on cleavage or has become schistose, has assumed a sort of crystalline aspect in some cases, and does not at first sight appear to be very closely connected with clays; but that slate is merely metamorphosed clay has now been proved beyond the shadow of a doubt. In the manufacture of roofing slates there is a considerable amount of waste, and in the quarrying of the material, also, much of it that has not assumed a closely-cleaved structure has to be thrown aside. These waste products are, in certain districts, carefully prepared, made plastic, and for many years have been employed in the manufacture of high-class bricks.

GENERAL BUILDING NEWS.

BOARD SCHOOL FOR THE SLAITHWAITE AND LINGARDS UNITED DISTRICT SCHOOL BOARD.—The first new Board School erected by this board has just been opened. The school is situated at Willer Lee, about one mile from Slaithwaite. It contains one large main room, two class-rooms, infants' room, separate cloak-rooms, lavatories, and entrances for boys and girls, and provides accommodation for 728 children. Adjoining the school the board has built a residence for the schoolmaster. The building is of local stone, and the roof is covered with green Westmoreland slates. The total cost, including furniture, will be 2,300*l.* Mr. J. Berry, of Huddersfield, is the architect. Mr. Berry has been instructed to prepare plans for a second mixed school proposed to be built at Nields, Slaithwaite, to accommodate 300 scholars.

BUILDING IN HAMILTON, N.B.—The past year has been a busy one in the building trade of Hamilton. The Dean of Guild Court have issued forty-seven linings, against thirty-three in the previous year, while the estimated cost of the structures is 48,000*l.* against 27,000*l.*

THE BUILDING TRADE IN DARWEN.—The building trade in Darwen has been very good during the past year, all branches in the trade having been fully employed, and several large buildings, and jobs having been carried out. The Technical School has been finished and opened.

St. George's Infant School, on the Lee, has been built, and alterations carried out at other schools during the year. Flag pits and stone quarries have had a very good year. Brickmakers and sanitary pipe works have also done fairly well.

BUILDING IN BIRMINGHAM IN 1894.—Mr. F. W. Lloyd, building surveyor, in his annual report of new buildings, &c., in Birmingham, for which plans were approved during the year 1894, has compiled a comparative statement of the three previous years. The total last year was 2,540; in 1893, 2,294; in 1892, 2,151; and in 1891, 1,541. One church has been erected—viz., St. Peter's R.C., which is situated at Dudley-road, and is in lieu of the temporary iron mission chapel. The following are the chapels:—Baptist, Arthur-road, Salfrey; Working Men's, Lodge-road; Gospel Mission Hall, Ladypool-road; Christian Meeting Room, Mary-street, Balsall Heath. Amongst the miscellaneous buildings are included a temporary iron mission-room, Camden-street, and another in Moseley-road (Church of England). Other miscellaneous buildings are the City Meat Market, Bradford-street and Cheapside; extension of Church of England Girls' Friendly Society's premises, Barwick-street; extension of Eye Hospital, Edmund-street; Heath Green-road Sunday School; extension of Villiers-street School and mission room, and extension of Washwood Heath Church; additions to St. George's Mission Room, Smith-street; New Mission Room, Farm-street; and Mission Room, Norton-street, Balsall Heath. The new schools are:—Baptist, Arthur-road, Salfrey; Board Schools, City-road; and Baptists Schools, Harborne. Additions to schools are:—Lavatories, Dixon-road Board Schools; class-rooms, Foundry-road Board Schools, St. James's Schools, Parish Schools, Ampton-road; class-rooms, Board School, Montgomery-street; Oratory Schools, Edgbaston; St. Chad's Cathedral School, Shadwell-street and Loveday-street; St. Peter's R.C. Schools, Broad-street; Wesleyan Schools, St. Mary's-street. Notices have been forwarded to property-owners and others in reference to dangerous buildings, &c., to the number of 740, and 247 factories have been visited *in* exits, &c., under the Factory and Workshops Act, 1891, 223 of which have been altered in accordance with the requirements of the Act. Forty-five square yards of ground have been given up by property owners and others setting back projections, &c.

BUILDING IN BARNSELY IN 1894.—Mr. J. H. Taylor, Borough Surveyor, has issued his annual statement of the plans passed by the Corporation of Barnsley in 1894, and of the number of buildings erected and completed. The return covers a period of fifteen years, and shows that greater provision for building was made last year than in any other year of the fifteen. There were deposited 115 sets of plans for 258 houses, 28 shops, 4 public buildings, 10 workshops, &c., and 35 alterations, a total of 340 proposed buildings and alterations. There have been erected during the year 181 houses, 7 shops, 7 workshops, &c., and 10 alterations have been made, making a total of 214 buildings erected and certified.

CATHOLIC CHURCH, CORK.—On the 6th inst. the Rev. Dr. O'Callaghan, Bishop of Cork, laid the corner-stone of the new church of St. Nicholas at Blackpool, in the cathedral parish of the city of Cork. The church will accommodate about 600 people. The building is being erected by Messrs. E. & P. O'Flynn, the architect being Mr. Samuel F. Hynes.

BUILDING TRADE IN ARRBROATH IN 1894.—The past year has been a busy year in the Arbroath building trade, mainly owing to the erection of the new High School. There have also been a good many masons employed at the restoration of the Old Church. There has also been a good many buildings of the ordinary type erected in the course of the year.

WORKMEN'S INSTITUTE, BLAENAVON, MONMOUTH.—On the 7th inst. a workmen's institute and town-hall was opened at Blaenavon, facing High-street. The buildings are in the Renaissance style, of blue Pennant stone, with Forest stone and Ebbw Vale buff brick dressing. The main entrance faces High-street, and gives access on the ground floor to the institute, and by means of staircases at each end of the entrance hall, to the large hall on the upper floor. The institute comprises newspaper-room, 41 ft. 6 in. by 20 ft.; library, magazine-room, reading-room, and billiard-room, and has also lavatories, &c. The hall on the upper floor is 86 ft. by 49 ft. 6 in., and, with the large gallery, is capable of accommodating about 1,500 people. The main landing to the hall is of fireproof construction. An entrance in Park-street is for reserved ticketholders and artists, for whom are provided retiring and cloak-rooms. The work has been carried out by Mr. John Morgan, builder, Blaenavon, from the designs of the architect, Mr. E. A. Lansdowne, Newport (Mon.), Mr. Chas. Mounton acting as clerk of works.

CATHOLIC CHURCH, CARRICK, IRELAND.—On the 30th inst. the Rev. J. Sheehan, Bishop of Waterford, blessed the new church attached to the Mercy Convent, Carrick. The new church is in the Romanesque style, and was built by Mr. Hearn, Waterford, from the designs of Mr. Byrne, architect, Dublin.

MISSION CHURCH AND SCHOOLS, ST. HELEN'S.—New elementary schools and a mission church have

just been built at St. Helen's. The architects are Messrs. Willink & Thicknesse, of Liverpool. The building has been erected on a site at the corner of Keswick-street and Wolsley-road. The school is designed to accommodate 400 boys on the ground floor and 400 girls on the first floor. The boys' portion is entered by wide doorways at each end of the north side, while the girls approach their school on the first floor by corresponding doors on the south side. The arrangement of the building has been largely governed by the necessity of making it serve the double purpose of school and mission church. When in use as a school the whole floor is sub-divided by means of glazed sliding shutters into the following different rooms:—Large school-room to hold 120, two small class-rooms ninety each, and two class-rooms fifty each. By sliding back all these shutters the whole of the space can be thrown into one large mission church, which will accommodate about 700 persons. A feature of the mission church is the little chancel which opens out of the large schoolroom. It communicates with this room by a semi-circular arch, which, when the chancel is not being used is entirely covered by revolving shutters. The arrangement of the first-floor school and class-rooms is identical with that of the ground-floor rooms. Lavatories and cloak-rooms have been provided in each case close to the entrances of the boys' and girls' school-rooms. In addition to these rooms, provision is made for masters' and mistresses' rooms, board-room, kitchen for parish teas, and girls' store-room for benches, &c. The staircases, landings, and cloak-room floors are of fireproof materials, the floor of the Mission Church being laid with solid wood blocks. The building is heated throughout by means of hot-water pipes on the low-pressure system. Fresh air extracted through steel trunks by automatic extractors fixed on the roof. The general contract was taken by the late Mr. John Whitaker, of St. Helen's, now the firm of Whitaker & Woods; the heating and ventilation by Messrs. John Gibbs & Company, of Liverpool; the joinery and wood-work by the late Mr. William Harrison, but upon his death was completed by Messrs. Whitaker & Woods; and the plumbing, glazing, and painting by Messrs. Critchley, Brothers, & Co., St. Helen's.

SANITARY AND ENGINEERING NEWS.

APPOINTMENT OF ARBITRATOR.—Mr. Edward Pritchard, M.Inst.C.E., of London and Birmingham, has been appointed sole arbitrator by the Hay Local Board (in the County of Brecon) and the Hay Waterworks Company, Limited, to determine the amount of the purchase money to be paid to the company by the Local Board for acquiring the waterworks undertaking.

SEWAGE SCHEME, SADDLEWORTH, YORKSHIRE.—The ceremony of cutting the first sod in connexion with the new sewage scheme for Saddleworth was recently performed by Mr. Wm. Buckley, J.P., the Chairman of the Rural Sanitary Committee, on the land between Dobcross and Saddleworth Station. Mr. McCallum is the engineer, Mr. Fotherby being the contractor.

DRAINAGE WORKS, GILLINGHAM, KENT.—Colonel Walter Gordon Ducas, R.E., one of the inspectors of the Local Government Board, recently held an enquiry at Gillingham-next-Chatham, with reference to the application of the Local Board of that parish for sanction to borrow 30,000*l.* for works of main drainage. A short time since the Local Government Board, by mandamus, imposed upon the Rochester Town Council the obligation of carrying out a scheme of drainage for a portion of their district, known as Borsdal, in which place one of Her Majesty's convict prisons is situated. They afterwards had their attention directed to the neighbouring parish of Gillingham (in which are the School of Military Engineering and the Royal Engineer Barracks), by a complaint addressed to them by a local firm of builders, who were unable to drain their property owing to the absence of public sewers. Before putting their compulsory powers into force, the Local Government Board gave time to carry out a scheme of drainage. The area of the Gillingham Board's district is 4,317 acres, and their population is rapidly growing, having increased from 14,608 in 1861 to 27,872 in 1891. At the present time the sewage of the district is discharged into cess-pools. Under the proposed main drainage scheme it is intended to pass the sewage through purified tanks, and to discharge the purified effluent into the River Medway. The solids will be converted into sludge, which will be dealt with in the same manner as it is disposed of at Wimbledon. The sewer will be carried into the main road leading to Chatham Dockyard, and will also be available for the drainage of the Royal Engineer Barracks and the new Naval Barracks about to be erected by the Lords of the Admiralty. The engineers for the scheme referred to are Messrs. Taylor, Sons, & Santo Crimp.

SEWAGE DISPOSAL SCHEME, STANLEY, DURHAM.—Local Government Board inquiry has been held at the Local Board Offices, Stanley, by Mr. G. W. Willocks, M.Inst.C.E., Government Engineering Inspector, in an application of the District

uncil to borrow 17,000*l.* for works of main sewerage and sewage disposal for the town. The scheme was explained by the Engineer, Mr. D. Hulme, of Newcastle-upon-Tyne, and comprises the laying of 10½ miles of 24, 18, 15, 12, and 9 inch sewers. Ventilation is provided by means of 100 ft surface openings and cast-iron pipe-shafts. At the head of each sewer there will be placed a automatic flushing-tank, with capacity of from 50 to 1,000 gallons, for systematic flushing of the sewers, and further by means of penstocks in manholes for impounding the sewage. The surface water from the roads is generally excluded from the sewers, the old drains being left in for that purpose. The capacity of the sewers duly provide for the very rapidly extending character of the town. The inquiry terminated by the consideration of an application by the Board for a further loan of 4,000*l.* for special street improvements.

STAINED GLASS AND DECORATION.

WINDOW, LEAMINGTON PARISH CHURCH.—The central window of the north aisle of Leamington Parish Church is being filled with stained glass. There are three main lights, which are designed to illustrate the words "Consider the lilies of the field how they grow." The work has been designed and painted by Messrs. F. Holt & Co., stained-glass works, Warwick.

A PROFESSIONAL CROSS.—A professional cross oak has been presented to "The Little Sisters of the Poor," Hartley, Plymouth; a gift from a philanthropist in their work. It has been carved the studios of Mr. Harry Hems, the final being carved by a cross which arms ending in interlaced terminations (three parts of a quatrefoil), the crucifix is carved in pear-wood, the stem of the cross being of oak with some simple ornamentation around partly of a spirally-wound label with an inscription. The whole appearance of the cross is very satisfactory, the design not attempting more than that the material will well bear.

MEMORIAL WINDOW, SOCIETY OF ANTIQUARIES OF SCOTLAND.—A window has been placed in the section of the National Portrait Gallery of Scotland devoted to the Museum of the Society of Antiquaries of Scotland. It is the gift of Mr. J. R. Findlay to the Board of Manufactures, and commemorates the opening of the Museum in the new building on August 1861, on the occasion of the meeting in Scotland of the Royal Archaeological Institute. The window, designed by Dr. Rowand Anderson, the Board's Architect, and executed by Mr. W. G. Boss, contains portraits of the office-bearers of the Society to the date in question. Its position is at the top of each stair, and is divided into two lights, and the portrait medallions are arranged in section on each side of the stone mullion. That of Her Majesty the Queen, the patroness of the Society, is inserted where, in ordinary circumstances, the archery would be, between the points of the two arches. Below the arching of each light is a medallion on the left carrying the Royal arms, while the right has the arms of the Society of Antiquaries of Scotland. The portraits come next, each head is enclosed in a circular floral wreath, with leaves and flowers or birds berries.

FOREIGN AND COLONIAL.

FRANCE.—An extraordinary meeting of the Municipal Council of Paris has been called to discuss the report of the special committee on the Metropolitan Railway. —M. Paulin has been appointed Professor of Architecture at the Ecole des Beaux-Arts, in place of M. Guadet, who has received another appointment. —M. Poussin has been appointed architect for the new prison at Fresnes-le-Rungis, near Paris. —The Municipal Council have devoted a sum of 2,430,000 fr. to the formation of an immense horticultural establishment at Boulogne, to replace that in the Avenue Henri Martin, which is known under the name of Fleuriste de la Muette. The establishment, which is to furnish material for the ornamentation of squares, parks, and gardens, is to be designed by I. Formigé. The architectural work alone will probably amount to nearly two million francs. —On the occasion of the new year the decoration of the Legion of Honour was conferred on M. Génoux, architect for the Imperial and Chateaux, and on M. Abraham Hirsch, chief official architect to the city of Lyons, from whose designs the new military medical school there was carried out. —M. Louis Martinet, a member and former Inspector in the Ecole des Beaux-Arts, is just dead. The death is also announced of the architect-designer, Alexandre Bida, at the age of eighty-two. He studied design and water-colour under the direction of Delacroix. From 1844 to 1846 he was travelling in the East, and brought home a number of studies. He received a medal in 1848, and was created "Officer" of the Legion of Honour in 1870. He obtained a gold medal in the 1889 Exhibition. —We much regret to announce also the death, at the age of forty-nine, of M. Jean Duran, the sculptor, pupil of Cavalier, who received the "Médaille d'Honneur" of the Salon in 1888 for his fine group "L'aveugle et le Paralytique." He

appeared to have still a brilliant career before him; but he has died of paralysis and in extreme poverty.

GERMANY. The Emperor has subscribed 500*l.* towards the erection of a monument to the late Professor von Helmholtz, in the chestnut grove close to the Berlin University. The designs will be by the sculptor Leubach, who was an intimate friend of the deceased Professor. —The Emperor, on a visit to Professor Hundreiser's studio, expressed his acquiescence in certain alterations to the original designs of the Rhenish Emperor William monument, at the Deutscher Eck. —Professor Beggs has completed his model of the equestrian statue of the late Emperor William for the Schlossfreiheit.

The work, which represents the Emperor three times life-size, is now open for public inspection in the Professor's studio. —The models for the statues of the Hohenzollern Princes, in the White Salon of the Palace, have been delivered and await the Emperor's inspection. The statues, which all represent the rulers in their youth, will probably be executed in marble next summer. —A competition is announced for the plans of a building in Berlin for the German Society of Engineers. The block to be erected at the corner of the Charlotten and Mittel-strassen at a cost of not more than 12,500*l.*, is to have five floors, the ground floor to be added for a bank.

Halle, von der Hude, Neckelmann, Schmieden, and Wallot, form the jury, and three premiums, of a total value of 250*l.* are to be given. —The Committee of the Municipality, appointed some time since to consider the advisability of purchasing a site for new Municipal offices, has now recommended the purchase of Nos. 35-37, Jüdenstrasse, on offer at about 78,000*l.* Until the erection of new offices some old buildings on the ground will be used provisionally for the Markish Provincial Museum. —The plan for an elevated electric railway has been rejected by the authorities, the reason given being that this method of construction does not admit of any junction with the existing lines.

The plans of the Electric Railway from the Silesian terminus to Stralan and Treptow, including a tunnel under the Spree, are now being considered by the Municipality. The line, which will be worked from a generating station at the Treptow end, is to be 4½ kilometres long, and will have eight intermediate stations. The length of the tunnel is 1½ miles.

The whole project can be completed in time for the 1896 Exhibition. —The English residents in Berlin have erected a monument to the late Henry Gill, for many years director of the Berlin Municipal Water-works, in the English church at the Montbijou Park. The monument consists of a relief head in marble, by Professor Janensch. The contractor and the architect of a hotel in Königswinter, the collapse of which during building resulted in the loss of five lives, have been sentenced to a year's and four months' imprisonment respectively. —The first winter meeting of the German Archaeological Institute at Rome was devoted to a Winckelmann commemoration. Professors Petersen and Oragio Marconi were the chief speakers. —A bust of Count Schenk is to be set up in the Schack Gallery at Munich, as soon as the alterations are completed. —The Imperial "Limes" Commission has just issued the first number of a work on the "Upper Germano-Roman Limes" of the Roman Empire, edited by Lieutenant von Sauer and Herr Heitner, the military and archaeological directors of the excavations. There will be seven volumes, to be completed in about fifty numbers.

THE TRANS-SIBERIAN RAILWAY.—The construction of the great Trans-Siberian Railway is now rapidly progressing. Within the next four years the main line between Ekaterinburg and Irkutsk, on Lake Baikal, about 2,000 miles long, will be finished. During the next two years will be constructed the section from Vladivostok to Chabarowsk, 400 miles long, when there remains the section Irkutsk-Chabarowsk, 1,600 miles in length; but this section is not in such immediate demand, inasmuch as the navigable river Amoor connects Irkutsk and Chabarowsk, except in a few short sections where railways might be constructed. Of the West Siberian Trunk line about one-fourth—viz., from Tschelabinsk to Obi, 450 miles—is already open to traffic, which is carried on with 29 engines, 440 covered and 537 open goods trucks, but only 8 passenger cars. In Central Asia, too, railway construction is being continued. The line from the Caspian Sea via Merv to Samarcand is to be extended to Tashkend.

MISCELLANEOUS.

WOOD PULP FLOOR MOSAICS.—The United States Commercial Agent at Bamberg, in a recent report, described a process invented and patented in Germany by W. Gutwasser, of Königsberg, Prussia, for manufacturing floor mosaics from wood pulp, which is expected to produce important results. The distinguishing features of the process are that the sections made according to it are not liable to any change of temperature, and are similar in all essential qualities to wood. Small particles of wood, such as fine cuttings, sawdust, &c., are soaked in a mixture of alcohol and shellac from the pores of the wood are penetrated, and then thoroughly dried. Afterwards the wood particles

are thoroughly mixed to a uniform consistency with a cement consisting of fresh cheese-whey, curd, and slacked lime, thinned with water so that it will distribute easily, uniformly, and perfectly enclose each particle of wood. The mixture thus produced is allowed to dry, until only moist, as if dry the curd would lose its cohesive power. The moist pulp is then put into mosaic moulds of the desired shape and size, and, in these forms, put under the press. As a result of the heat, the shellac softens, regaining its adhesive powers, and the cement hardens rapidly, both substances uniting under the pressure so perfectly with the wood particles that the resulting mass may in a few minutes be taken out of the moulds. In preparing wood pulp for the manufacture of vari-coloured mosaics, (1) the particles of different varieties of wood are put through the process separately, so that the natural colour of the wood is brought into prominence. (2) Dyes, dissolved in alcohol, are mixed with the shellac solution before the wood particles are coated. (3) The wood particles are first coated with dyes, dissolved in water, and allowed to dry well before the coating with the shellac solution. For ordinary floors it suffices to manufacture mosaics of different colours, changing them at pleasure so as to form a variety of patterns. In making pattern or fancy-wood mosaics, pattern moulds of the desired design, divided into fields and figures, are fitted into the plain mould; each section of the design is filled with dyed wood-pulp, and the pattern-mould removed, after which the whole, thus truly outlined, is subjected to heat and pressure, the result being perfect vari-coloured fancy mosaic.

ROYAL AQUARIUM.—It is announced that the collection of "Artistic Posters" at the Aquarium has been increased by about sixty new examples, including designs by Sir Jas. Linton, Mr. Chas. Green, Mr. F. Barnard, Mr. Walter Crane, Mr. Linley Sambourne, and others. The exhibition will remain open till the end of February. The exhibition in its original form did not strike us as containing much that was of interest; the new contributions may render it better worth a visit.

ARCHITECTURAL ASSOCIATION.—DISCUSSION SECTION.—A meeting of the Discussion Section of the Architectural Association was held at the rooms of the Association on Wednesday. Mr. W. Henry White occupied the chair. A paper, entitled "Gardening and Kindred Matters," was read by Mr. W. Bonner Hopkins, A.R.I.B.A., who sketched the history and noticed the bibliography of the subject. In the second part of the paper Mr. Hopkins treated of the arrangement of grounds, with special reference to domestic buildings, public buildings, public gardens and parks, and cemeteries. The discussion was opened by Mr. Harry Sirt, and continued by Messrs. A. B. Thomas, E. Greenop, H. A. Sutcliffe, S. W. Cranfield, and the Chairman, Mr. Hopkins having replied to the points raised in the discussion, the meeting terminated.

THE COMMISSION OF SEWERS.—At the first meeting of the year of the Commission of Sewers held on Tuesday last, a long discussion took place on a motion by Mr. Briggman (architect) to effect an improvement in Aldersbury by setting back and rebuilding the house No. 73, which the mover of the resolution declared could be effected for 50*l.* In opposition to the project, Mr. Wallace, Chairman of the Finance and Improvement Committee, declared that it might cost 100,000*l.* or 125,000*l.* The motion was eventually lost by a two to one vote.

It was announced that on the 22nd inst. the foundation-stone of the new offices of the Commission would be laid by the Chairman, Mr. Alderman Bell. The question of the proposed widening of the approaches to Aldersgate-street from St. Paul's Churchyard and the east-end of Paternoster-row was referred to the Finance and Improvement Committee. The Clerk of the Commission, Mr. Blake, after forty-three years' service, asked to be allowed to resign in favour of a new chief of the clerical staff. The resignation was accepted with expressions of the regret of the members of the Commission.

IMPORTS AND EXPORTS OF BUILDING MATERIALS IN 1894.—We learn from the Board of Trade returns for the year, as well as from Messrs. Foy, Morgan, & Co.'s Wood Report, 1894, that while our exports of building materials continue to show a decrease, imports, especially of wood, are still increasing. Taking the latter first, we find that the imports of all descriptions of wood last year amounted to 8,069,060 loads, valued at 17,750,167*l.*, compared with 7,179,157 loads, valued at 16,094,191*l.*, in 1893, and 7,849,382 loads, valued at 17,795,834*l.*, in 1892. What is also apparent is that, although imports of wood in 1894 were 12 per cent. in excess of those of the preceding year and 8 per cent. above the average, lower prices are now realised. There has also been an increase in the imports of glass. The quantity of window and German sheet imported last year amounted to 1,114,754 cwt., valued at 575,938*l.*, against 936,825 cwt. (539,040*l.*) in 1893, and 993,117 cwt. (554,231*l.*) in 1892. The imports of plate-glass were 248,934 cwt. (330,045*l.*) in 1894, 193,471 cwt. (293,610*l.*) in 1893, and 212,159 cwt. (334,303*l.*) in 1892. Of girders, beams, and pillars, 69,420 tons were imported, against 66,326 tons in 1893, and 71,586 in 1892; the values being 428,290*l.*, 419,284*l.*, and 502,574*l.*, respectively. In all these articles of import the tendency

was considered more suitable to the steep gradient and to the traffic, which mainly consisted of passengers. There was one intermediate station. A longitudinal section of the line showed the heaviest gradient to be 1 in 66, on which there was one trestle 160 long, and on a curve of 213 ft radius. The gauge was 4 ft 6 in. The road-bed was 12 ft wide, weighing 40 lbs. per yard, on transverse stone sleepers, 6 ft long, which weighed 55 lbs. each, placed 3 ft apart, except at rail-joints, where the distance was only 1 ft 6 in. The rack was formed by two 3-in. plates carried by chairs bolted to the sleepers. The rack was anchored at intervals by rails driven into the ground between the sleepers. The ballast was of broken stone retained by dry-stone walls 18 in. high and 10 ft apart. Retaining walls were also built of dry stone where banks had to be retained.

The third paper, on the Usui Mountain Railway, Japan, by Mr. C. E. Swinall, M. Inst. C.E., described the railway here treated of.

The railway here treated of was built to connect Tokio with the west coast of the main island. In doing so the central range of mountains had to be crossed at the Usui Pass. By the end of 1888, the railway had been built on both sides of the mountains, leaving a gap, the closing of which presented a difficult problem. In the Usui Pass the distance from the base to the summit of the pass was five miles, while the difference of levels was 1,830 ft, or 366 ft per mile. The conditions were therefore more difficult than those of the St. Gothard line in the ratio of 8 to 5. A final survey in 1890 resulted in a decision to adopt the Abt system, with a rack incline of 1 in 66. The height of the passing-place half-way to increase the traffic capacity of the line. The aggregate length of tunnel was 2½ miles, the longest being 600 yards. All bridges and viaducts were built with brick arches, from a fear that girder construction would not offer sufficient security. The largest bridge was in the form of four arches of 60 ft span each, the height of the central pier to rail-level being 100 ft. The piers were specially designed to resist earthquakes, according to the formulas of Professor John Milne, F.R.S., and could resist an acceleration per second of 4 ft. The weight was 50 per cent. greater than that which would be required for the same bridge in the absence of earthquake in Japan of 1891. The gauge was 4 ft 6 in. The rack consisted of three plates, 18 in. thick, bolted to chairs which were again bolted to the steel cross-sleepers of the permanent way. The rack-bars, with chairs and fastenings, weighed 20 tons per mile, and the cost, including the sleepers, was 3,000 £. The expenditure on the expense of laying. Details of the expenditure of the railway were given in Japanese dollars, and sterling at the rate of exchange of three shillings per dollar. The total cost was 298,668 £. The tunnel formed the heaviest item, and their average cost was 55 £ per yard. The rails besides carrying the traffic, which formed a separate track, were used for coal, including equipment, amounted to almost 42,700 £ per mile.

A. Kellert	444	16	0	T. Livingston	375
Hacche & Povey	433	1	7	C. Simmons*	375

* Accepted.

The Builder.

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JANUARY 19 1895.

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New Opera House, St. Petersburg: Longitudinal Section.—Professor Von Schreoter, Architect.....	Double-Page Ink-Photo.
South-Eastern Agricultural College, Wye, Kent.—Mr. Paul B. Chambers, Architect.....	Double-Page Photo-Litho.
Stables and Entrance Lodge, Bisham-on-Thames.—Messrs. Kidner & Berry, Architects.....	
Sketches by Mr. R. Shekleton Balfour, R.I.B.A. Pugin Student, 1894.....	Double-Page Ink-Photo.

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Decorative Art at Burlington House.



THE contents of the "Water-colour Room" at the Burlington House Loan Exhibition are described in the catalogue as "a collection illustrating the Sculptor—Goldsmiths' Art"; a rather awkward phraseology, which is, however, perhaps the best definition of a class of artistic work rather difficult to define. It includes, one may say, that kind of work in gold or silver, with or without the embellishment of coloured enamel or precious stones, in which articles of use or of personal adornment are made the vehicle of original artistic thought and fancy. The collection is crowded into a small space, some drawings round half the wall, and a few cases; but the amount of interesting and beautiful work to be found there is much more extensive and various than could be supposed at a first glance. The great majority of the collection is lent by a single owner—Sir J. C. Robinson, to whom the public are much indebted for his liberal contributions to the show. The set of drawings hung on the walls are entirely from his collection, and represent original designs for work chiefly of the fifteenth, sixteenth, and seventeenth centuries. Nearly all are of interest in themselves, and the majority are the work of artists of name and fame.

Into designs of this class there comes a great deal of architectural or semi-architectural detail. The translation of architectural detail into forms suitable for silversmiths' work is a problem not very often successfully solved. In the work of the present day it generally means little better than a mere imitation of architectural features in miniature; a key with a Corinthian column and capital for the blank, for instance, used in a position and a manner for which the form selected is quite unsuited. We want in such a case, if architectural detail is used at all, a modification of the architectural form into something which recalls the original, but in a form suitable to the character and capabilities of metal-work. Generally speaking, architectural detail has to be attenuated in character in the process of translation into metal-work. This is often exceedingly

well done in Mediæval monstrances and other such articles, where we see the general form of the Gothic buttress, for instance, changed into a thin-lined and elegant fringe to the body of the article, in a manner recalling its origin and suggesting architectural associations, but deprived of architectural constructive character. This is not badly done in the first drawing exhibited, "Design for a Monstrance, Flemish Gothic c. 1490"; not a good drawing (many of the drawings here are very faulty in mere draughtsmanship), and not representing a good form of detail; but the detail is properly treated for silver work—thinned out into slender proportions. In the "Italian Design for a Bronze or Silver Vase" (2) we have parted company with architecture again, except so far as the mere division of the design by mouldings is concerned; this is the simple vase form; a good design, shown in exceedingly bad drawing, with all the curves out of perspective; the man who did this was not a master in drawing, at all events; it served as a diagram for the silversmith to work from; but it is rather odd that a drawing should be exhibited for our admiration, as a bit of old work, which would infallibly put the lowest grade South Kensington student out of court. No. 3, "Design for a Saliera" (salt-cellar), by Pierino del Vaga, brings us round into the right path again, and is well worth study. This is one of semi-architectural designs; an octagon on plan with concave sides; on the upper portion are terminal figures with their backs to the centre-piece; but the terminals, instead of being solidly modelled, fly out from the background in curves of thin metal standing free, exactly in a manner which would be totally out of place in an architectural terminal, but which is the very treatment for metal. If this design were re-drawn by a modern artist in the modern manner, it would unquestionably be attributed to Mr. Gilbert, who more than any one else has assimilated the Italian Renaissance spirit in the treatment of metal.

With drawings No. 5 and 7 we come across the weaknesses of Renaissance design; the employment of the goat's head and neck as the mouth of the vase in one—though this is a fancy that may pass; the griffin's head and neck springing out of a human mask on the front of the vase in No. 7—a fancy that may not pass, but which, like Artemus Ward's Red Indian, "is poison wherever met with," even in Italian Renaissance design, where there is far too much of it.

Bad taste is bad taste, in whatever period or art it is found.

Stothard's designs mean to be the right sort of thing, without always quite succeeding. His "Design for a Panel for Wall-painting or Painted Glass" (10), with cupids seated in the bells of conventional flowers, is pretty and truly decorative in some parts, but spoiled by the rather clumsy figure of the dancing woman in the upper portion, and still more by the clashing of natural with conventional foliage forms in the grape and vine leaf ornament round the top. His two designs for silversmiths' work (11 and 12), for alto-relief groups round the outer edge of a bowl or salver, are very good work of their kind, but they seem somehow to have "Rundell & Bridge" stamped on them, and the relief is too high for the decoration of objects of use; there is too much the look of incrustation about it. There is the mark of "Rundell & Bridge" too about Flaxman's in many respects fine design for a silver candelabrum (13); a design triangular on plan, with three nondescript animals (bears?) backed against the base of the pedestal, and three draped female figures above who hold up an infant to a fourth figure that stoops head downwards to take it; these groups forming the stem of the candelabrum. This is an admirable drawing; but one does not like the use of the figure, or of a group of figures, in so important a "piece," merely as a stem to be clutched by the hand whenever the thing is moved. In other respects it would be a fine "centre-piece" for a table, no doubt. The design for a monument in St. Paul's by Grinling Gibbons (14) is amusing; the original contract is given, wherein it is described as "a handsome marble monument enriched by festoons, and mantling elevated by two Cupids": need we go further? Nor is Benvenuto Cellini's mace (15) worth very much; but Michelangelo's "Saliera" (17) for the Duke of Urbino is a thing of fine and sculpturesque design, especially in the curious and original treatment of the birds' necks which seem flattened on the top of the lid and peer over the edge. The feet are rather too furniture-looking in design, for silver. A note in the catalogue mentions that this is the first drawing which has come to light for a piece of work which has probably perished, and which is otherwise known of only through the letters which passed between the great artist and the duke's agent. Some of the questionable taste of

the time is in it, in the grotesque masks which are thrust into the design, but there is a kind of impress of Michelangelo's hand about it. Next to this hangs his finished drawing for the "Fall of Phaeton," a design well known by engravings.

A pen drawing (19) of Dürer's well-known design of "The Coat of Arms with the Skull," whether by the master himself or not (on which the catalogue speaks doubtfully) is a beautiful piece of pen drawing, possibly rather too neat and finished to represent the large and strong hand of Dürer. A design by Dürer for execution in relief in silver (20) is a charming bit of work. It is drawn in light medium on a dark ground (giving somewhat the effect of silver), and represents the Virgin enthroned, the arm or standard of the throne being formed by a child-angel with a harp standing on a vase; the *encadrement* of the figure is only finished on one side. There is a great charm about this little design, which stands quite alone and resembles nothing else in the room.

Among the remaining drawings are two or three other German designs assigned doubtfully to Albert Dürer, and which in point of taste present some of the worst qualities of German Renaissance work; designs for two bronze door-knockers (26) "by a Venetian artist, c. 1600," and which illustrate the mistake of over-elaboration and too lavish throwing away of figure-design—the knockers showing small nude figures sprawling all about them in a manner quite inconsistent with their proper mechanical expression as knockers; and eleven original designs by Giulio Romano, or working drawings from his designs by his scholars or by goldsmiths working under his orders for the Gonzaga family. The style of these, though they are not, perhaps, what would be called remarkable works, is for the most part very pure and good; the design for an incense-vessel (27), with its rather flat shape (somewhat like that of a Greek *cylix*) and its eagle-head handles, is exceedingly good; the two designs for silver ewers, 29 and 30, are also worth special attention; and the design for a salt-cellar (37), though simple enough, has the merit of consistency and of good lines. There are fewer faults in these designs by Romano and his pupils than in some of the earlier-mentioned drawings; yet one cannot help admitting that some of those which have the most glaring faults are also the most striking and original, and that genius without good taste is sometimes better than good taste without genius.

The contents of the cases of objects in the room we can only describe generally, drawing attention here and there to some which are of exceptional artistic value or which illustrate some point in regard to design. Case A contains mainly articles of personal adornment, jewelled pendants and crosses, &c. The group numbered 7 contains some Spanish pectoral crosses which are worth attention, especially one ornamented with a delicately-executed geometrical diaper in relief in gold. A reliquary, a Spanish cylindrical crystal gold-mounted (10 H), is a beautiful little object; the knife and fork with ivory handles carved into figures (28), and believed to be by Faiderbe of Brussels (c. 1630), represent work of more than usual vigour and character; a scent-case, silver inlaid with niello work (29), "probably Florentine," is an excellent example of this form of inlay ornament. One of the most original things in Case A is the casket of old Chinese porcelain (48) mounted on ormolu; this is called "French work probably eighteenth century," which we presume refers to the mounting, but the point in the design is the treatment of the porcelain cover, with a deeply-incised conventional foliage design sunk from the flat surface, a beautiful and most effective bit of work, combining richness of effect with severity of line.

All the objects referred to are the loan of Sir J. C. Robinson unless where otherwise mentioned. Case B, a very miscellaneous collection, contains some of the most re-

markable things in the exhibition. Prominent among these is the small gilt bronze lectern (49) of Spanish work of about 1520, and believed to be by the goldsmith Becerril of Cuenca; it formerly belonged to one of the private chapels in the Cathedral of Valencia. This is a rich and delicate work, very Spanish in general effect, though the design of the scroll-work in relief in front is on Italian models; the book-rest is curiously formed of an open railing of semi-architectural design, each rail consisting of a square baluster-like shaft in dark bronze, capped by a gilt female terminal figure. The Italian casket (52), silver "parcel-gilt" (as South Kensington delights to call it), is a useful lesson to the effect that mere richness of treatment and material availeth not to produce art, where fancy and power of design are absent. This is a large casket with a barrel-roof lid, divided up mechanically into stiles and panels, as it were, with ornament at the intersections of the panels; it must have cost a good deal to produce it, and it is worth little when done. Compare it with the Indo-Portuguese Goa casket on the other side of the case (53), carved ivory with lock and hinges in gold, and the distinction between art and mere industry is emphasised. The Indian gold-enamelled box in the form of a shell (72) is an object of marked character. But nothing in this case is better, from an artistic point of view, than the Elizabethan silver-gilt cup and cover (89) at one end of the case, a work in perfect taste, showing pure and harmonious form and proportion, relieved with ornament which is sufficient to give it richness of surface-effect without in any way interfering with the lines of the design. Artists in such work should study this example, and learn its lesson.

In the centre of Case C is a fine and curious piece of work (98) of very unusual appearance. This is an appliqué relief, repoussé work in gold on a ground of blacked glass. It appears to represent the dead Christ, and the Virgin standing mourning over Him; her figure, with very finely designed drapery, standing out in gold against the black semi-transparent background. It is by the Venetian goldsmith, Cesare di Treviso, and was made for Philip II. of Spain. Among the finest objects in the same case is the Venetian cassiolette or perfume-burner (108) in gilt metal, with pierced panels, and designed with a cornice and a dome-shaped top, also pierced in arabesque patterns. It has that semi-Oriental feeling which (naturally) often permeates Venetian decorative work. An Indian box enamelled in silver (133) is another of the artistic gems of this case; among its curiosities are a box (138) carved out of a shell, with a design showing a column and two figures, and a long-stemmed pipe in ivory, Venetian work (143), carved all along the length of the stem with foliage and little nude figures; a beautiful bit of work, though not suitable to its position, for the stem could hardly be comfortable to hold, and (as in the case of the Venetian knockers before-mentioned, the figure as an ornament seems to be misapplied here. The stem is made in three pieces fitting into each other.

Case F contains mostly larger objects than the rest; large ewers, salvers, and cups, among which again instructive contrasts may be noted, and lessons learned both as to what to imitate and what to avoid. The great burly German cup (3) lent by Lord Battersea, all over lumps and knobs, is an example on the latter side; and Lord Rothschild's German cup (9), "silver-gilt, richly ornamented and enamelled," and no doubt a very costly piece of work, may be compared with its pendant in the shape of the Spanish Gothic cup (13) lent by the same owner, a cup with a flat-shaped bowl with a spirally-scalloped cover. The latter is very simple work compared with No. 9, but how far superior in balance and proportion of outline and in all the qualities which go to give artistic value to such an object. The

Germans were the chief sinners in regard to over-elaboration of this kind, but Lady Wallace's cup (7). Italian late sixteenth-century work, shows that the Italians were not always immaculate in this respect. This is a most costly-looking work, and probably costly enough in reality, but it looks too much as if that costliness had been the main object; it is encrusted with jewels to an extent which out-does its own object, destroys repose of design, and interferes with the appreciation of form. A small cup, silver parcel-gilt (12), lent by Mr. Durlacher, is an object worth study, and so is the salt-cellar (11), lent by Lord Rothschild, "silver-gilt, probably Spanish," a piece of work on very architectural lines, with six terminal caryatides surrounding it, standing out free from the body of the box, or projecting moulded pedestals which in their turn are carried on small figures of lions which form the feet. These are out of scale, of course, with the caryatides, which is a defect; but in general this is a good example of the translation of architectural design into silversmiths' work.

Case G contains mostly small objects, lent by different owners; pendants, brooches, &c., and there is a great deal that is beautiful and interesting among its contents. Two or three Russian crosses, &c., have a character of their own, and one bit of Russian work, a hexagonal pendant in silver (3), with a head of Christ in gold under a crystal, is of exceptional picturesqueness of design and effect. A gold enamelled Spanish cross (16) is peculiar and very pretty in its effect from the use entirely of white enamel. Among other objects of special interest in this case are the small miniature-frame (45) of gold pierced, and with foliated repoussé ornament, lent by Mr. Salting; and the Dutch silver book-clasp (46) lent by Mr. Spread. But the gems of this case are the Greek ear-rings and necklace (35, 36), lent by Mr. Heseltine. The necklace, gold with onyx beads, and the clasp formed by two bulls' heads, is a remarkably fine specimen of a style of necklace design of which there are a good many examples in ancient Greek work; but the ear-rings are exceptional. They are little nude winged figures, the pair slightly varied in attitude, the wings large and widely spread, in the most delicate thin gold, stretching upwards above the figures. These are the most beautiful things in the whole collection; they are the pure poetry of goldsmiths' work, and the few goldsmiths among us who attempt anything artistic should not fail to look at them. How much the English know about the achievements of the ancient Greek goldsmith we had an intimation while looking at these, in the remark of a bystander to her companion—"Only think of the Greeks being able to do that!" It seems the gold-room of the British Museum is still a *terra incognita* to the average Londoner, who ought otherwise to be aware that ancient Greek gold-work holds the supreme place, for beauty of design and delicacy of execution, above all other productions of the kind. The devotion of a room at the Burlington House loan exhibitions to work of this kind may do something to wake up the public taste and knowledge on such subjects, and it is to be hoped the experiment will be repeated. There must be plenty of material in England to fill a room with ancient decorative art at the winter exhibitions; and perhaps in time the Royal Academy may come to see that it is advisable to stimulate the modern production of artistic gold and silver work in their more fashionable summer exhibitions, where it is at present so entirely neglected.

WINDOW, ST. GILES' CATHEDRAL, EDINBURGH.—A large five-light memorial window has just been placed in St. Giles' Cathedral on the east side of the south transept. It has been erected to the memory of the late James Bryson. The subject, as laid down in the general scheme of the cathedral windows, is illustrative of the text, which is introduced into the lower part of the window, "They were all filled with the Holy Ghost." The work has been carried out at the studios of Messrs. A. Ballantine & Gardiner, Edinburgh.

THE PARISH COUNCILS.

THE Parish Councils are now elected throughout the country, and with the commencement of the New Year they will have begun their administrative work. We may expect this work to be performed in a very varied manner; in some places considerable energy and intelligence will certainly be seen in the administration of the duties of the Parish Councils, others it is probable that considerable energy will characterise their proceedings, many respects the duties which devolve upon these new bodies are not such as fall within the cognisance of this journal. We are not concerned, for example, with the question of allotments. But some of the direct and indirect functions of the Parish Councils touch on matters with which we think it desirable to deal from time to time. The duties of the Parish Councils arise either from what may be termed their actual jurisdiction—that is to say, they come from powers directly conferred on them by the Local Government Act, 1894, or from powers conferred under certain Acts of Parliament, such as the "Adoptive Acts," which may or may not be adopted by a Parish Council.

It will be convenient to consider first the duties of the direct and existing duties of the Parish Council. It may provide or acquire land for public offices and for meetings, for any purposes connected with parish business. This is a power which is hardly likely to be exercised to any large extent for some time to come. It is pretty sure, however, in large parishes not altogether to be a dead letter. In many large villages the Parish Council will have to meet at regular intervals, and work will have to be done by committees, the want of a central building will be keenly felt. We have seen more than once pointed out the need in many considerable villages of a public hall, a power to which we are now referring. We enable Parish Councils to provide themselves with a public office, which will also be available for use for purposes of business recreation by the village generally. Among the adoptive Acts is the Public Libraries Act, 1892, and it is obvious that if this Act is adopted, some kind of co-operation may be brought into existence between the Parish Council office and a public library. There cannot be a doubt that the blessing of such a building would be a considerable advance in village life. If it is designed with taste, it would also be a valuable addition to the architecture of the ordinary village.

Another direct power given to the Parish Council is to provide or acquire land for a recreation-ground and public walks. There is no question that a recreation-ground is valuable in every village. The absence of such a place is now more marked since the Education Department has paid greater attention to the provision of playgrounds in connexion with elementary schools. In this respect the village is often worse off than many a hamlet in a town, who has some public ground within reach, since the former can only move away from a highway and repassing on some farmer's land. A recreation-ground properly fenced will certainly tend, in some degree, to add to the health and pleasure of the villager, and by doing help, in some small degree, to prevent the constant exodus from the village to the town.

It is probable that the exercise of this power will be more popular with the villagers than that given to utilise any well, spring, or stream, and to provide facilities for obtaining water therefrom. This power will undoubtedly enable a Parish Council to supply a village with wholesome water. But the villager will like to see the well which he has known from boyhood free to him and beast, guarded and properly utilised, free from doubt. We have over and over again in our "Notes" referred to reports of the Local Government Board showing how various attacks of sickness in

rural places have arisen from a bad water supply. In this respect many of the larger Rural Sanitary Authorities have shown great apathy. It remains to be seen whether the smaller body, the Parish Council, responsible for a very limited area, will show more energy. It will have power also to deal with any pond, pool, open ditch, drain, or place containing or used for the collection of any drainage, filth, stagnant water, or matter likely to be prejudicial to health, by draining, cleansing, or covering it, or otherwise preventing it from being prejudicial to health. This power, coupled with that to which we have just alluded, really gives a Parish Council large sanitary powers: for it is the want of pure water and the presence of foul ponds and ditches which are the two main causes of disease in the villages of rural England. Elaborate drainage schemes are unnecessary and impossible, extensive supplies of water from a distance are equally out of the question. What is needed is that the village should be treated as a properly-managed country house; that is to say, that the water and drainage should be good, without elaborate machinery. Further, under the sixth section of the Act, a Parish Council "shall have the same power of making any complaint or representation as to unhealthy dwellings or obstructive buildings as is conferred on inhabitant-householders by the Housing of the Working Classes Act, 1890." It is unnecessary to refer in detail to the latter Act, but there can be little doubt that its provisions are more likely to be enforced when the Sanitary Authority, now the District Council, may be set in motion by a representative body, than when this could be done by four inhabitant-householders. A householder might have good reasons for bringing the insanitary state of a dwelling before the Sanitary Authority, but he might have difficulty in getting three others to join him. There would be fear of hurting the feelings of a neighbour, and various other reasons. Now, when a member of the Parish Council brings the matter in ordinary course before that body, it may well be that he will receive cordial support. In fact, we regard this provision of the Local Government Act as being likely to have a very considerable effect on the sanitary state of our rural districts. Individual energy will have an easier task than heretofore, for the sanitary areas will in some respects and for some purposes be smaller. The Rural Sanitary Authorities have hitherto by no means done as much as they might have to improve the condition of the villages. Now the village will, to some limited extent, as we have pointed out, be able to manage its humbler sanitary affairs and its own water supply, and it will also be able to put pressure on the District Council, which has now become the Rural Sanitary Authority. On the Parish Councils there have been elected plenty of men of common sense and energy, and we look with confidence to a considerable advance in sanitation—irregular, no doubt, but distinct—through the agency of the recently-elected Councils. It is desirable that some of the special powers given to these bodies should be clearly pointed out, so that there may be opportunity found for their exercise in a reasonable and fair manner without delay.

NEW JUSTICE OF THE PEACE.—Mr. Matthew Wallace, of the Albion Iron Company, was on the 9th inst. sworn in as Justice of the Peace for the County of London, before Sir Peter Edlin, Q.C., at the Middlesex Sessions, Clerkenwell.

RESIGNATION OF AN ENGINEER.—In reference to the paragraph which appeared under this heading in our last issue, page 23, we inadvertently stated that Mr. W. Nisbet Blair, C.E., had been compelled, owing to a serious illness, to resign the office of engineer and surveyor to the Vestry of St. Leonard, Shoreditch. The name should have been Mr. A. N. Hawtrej, now one of the assistant surveyors to the St. Pancras Vestry, of which body Mr. Blair is chief engineer and surveyor. The error occurred owing to the rather ambiguous communication which we received from Mr. Hawtrej himself.

NOTES.

THE reception which M. Chedanne met with at the Institute of Architects on Monday night, enthusiastic as it was, was certainly no more than he fully merited. That his drawings would arouse the highest admiration from English architects when once seen we had never the slightest doubt; but the account read by Mr. Spiers, on the basis of M. Chedanne's Report, of the process of investigation by which the French architect arrived at the conclusion that the Pantheon portico consisted of the original materials of a decastyle portico, used over again for an octastyle one, is one of the most brilliant examples of acuteness of observation and deduction in regard to the constitution of an ancient building, and (what is more) of success in such deduction, that we have heard of, and establishes M. Chedanne as an architectural investigator of the first order. The main points of the process are given in our abbreviated report of Mr. Spiers's communication, and the chain of reasoning and of facts appears complete and impregnable. Another new fact was brought out on the same occasion, as it appears that the dome of the Pantheon is after all in fact built of brick; but of brick in level courses and not in domical form. The conclusion of Professor Middleton, that the dome was only a mass of concrete, is thus negatived in regard to the mere material and the method of disposing it; but it does not seem to have been quite sufficiently recognised that this is more a difference in detail than in principle, and that the English archaeologist was right in the most important point; viz., that the dome was constructively not a dome at all in the proper sense. Whether the materials were the irregular rubble used in concrete, or whether they were shaped bricks built flat, it is quite certain that the stability of the dome depends mainly on the cementing material. A properly-constructed dome could, with care, be built without any mortar, though practically its life would probably be rather precarious; the Pantheon dome assuredly could not have been so built. In a historic sense it is of interest to find that, at the period when they could carry out so bold a piece of work, the Romans really did not know how to build a dome at all; but one can hardly say that the result of M. Chedanne's investigations increases one's respect for the builders of the Pantheon. It is but a clumsy and rule-of-thumb piece of construction that has been unveiled to us; and if the dome had really been constructed as Viollet le-Duc and M. Choisy too hastily concluded that it was, one would have felt a good deal more respect for it as a construction. Architecturally no doubt the building is (internally) one of the noblest conceptions in existence. It is worth noting that the interest of the subject, and the fame of M. Chedanne's drawings, has to some extent excited the attention even of the daily press of this country—usually so stolidly indifferent to everything in the shape of architectural achievement or investigation.

THE German Archaeological Institute at Athens has just issued its full programme for the two archaeological tours to take place after Easter this year, and as foreign specialists are admitted a summary may be of interest to our readers. The first tour, through the Peloponnese, begins on Easter Monday. A day is spent in succession at each of the following places:—Corinth, with Nauplia; Tiryns, including the recently excavated Heraeum at Argos; Mycenae, Epidauros, Argos, with Tripoli; Mantinea, Megalopolis, Lykosura, Bassae, Samikon. This brings us to Olympia, where a halt of four days is allowed, at the end of which the tour of Professor Curtius is to be unveiled in the Olympian Museum. After Olympia the party proceeds to Patras, and thence in a private steamer to Itea, for Delphi, where the last two days will be

spent, and Athens will be reached on April 30. What combination can do is shown by the fact that the cost per person is estimated at ten marks a day, whereas the ordinary private traveller, with his dragoman, must expect to pay about forty. Dr. Dörpfeld is always good for a five hours' lecture per diem, but the weaker brethren will be glad to learn that before the "island journey" begins, on May 6, they have five days' rest at Athens. The second programme is as follows, and as it is entirely performed in a private steamer it will be far less exhausting:—*Ægina*, and *Poros*, *Sunium* and *Thoricus*, *Oropos* and *Eubœa*, *Rhamnus* and *Marathon*, *Delos*, *Mykonos* and *Assos*, a whole Sunday at *Assos*, and two final days for *Troy*. *Troy* and *Assos* are only provisionally advertised, in case there is no Turkish quarantine. The "island journey" is to cost about sixteen marks a day, and ladies may join it. It will be seen that the two journeys cover the whole field of recent Greek excavations.

MR. T. G. JACKSON'S letter in our last issue upon the subject of the obstruction of a certain air space in the rear of a building at Wimbledon by a new erection connected with the original building, carried on the controversy raised in the *Times*, upon which we made some comments in our issue of the 5th inst. According to Mr. Jackson's last statement the original air space has been largely curtailed by a block of buildings lately erected. This has been allowed by the Wimbledon District Council on the ground that it is an addition to an old building, and not a new building, and so not within the meaning of the by-law in regard to air space behind a new building. As we previously pointed out, it is almost impossible, from our point of view, to form an opinion on the propriety of the action of the Wimbledon District Council without a complete knowledge of all the facts of the case. It is obvious, however, that in the public interest the particular by-law should be strictly construed, otherwise it may often be reduced to a dead letter. Without in any way affirming that it would be a test of a new building, we may, however, suggest that where a new foundation is placed in the ground beyond the area of the old foundation, for a purpose other than something clearly in the nature of a new addition, such as a bow-window or a porch, that circumstance may to some extent furnish a reasonable test. But it must further be pointed out, that according to Section 157, Sub-section 3, of the Public Health Act, an urban authority may make by-laws "with respect to the sufficiency of space about buildings, to secure a free circulation of air." If, as we presume is the case, the particular by-law of the Wimbledon District Council is made under this section, it appears to be worded in too narrow a manner. The by-law speaks of new buildings; the word "new" should be omitted, so that the space which is required behind a building when first erected should not be diminished by any kind of erection, even if it be a mere addition. The Act clearly contemplates a permanent air space, it does not mention the word "new," and we can see no reason why the Wimbledon Authority inserted the word "new" in their by-law. But if the original or "old" building, to which Mr. Jackson refers, was erected since the by-law came into existence, then it would appear that there has been an infringement of the by-law, which is intended, unless it is to be useless, to compel the maintenance of a certain air space behind a building when it is erected. This air-space once having been given remains an adjunct to a building, otherwise there may be an air-space behind a building for twelve months after its erection, and then the owner might build on it a so-called "addition," and defend his action on the ground that the by-law only requires an air space to be given to a new building, and not to an addition. This latter point of

view does away with the need for considering if a structure is a new building or an addition, and it appears to be the only way in which the objects of the Act can be attained.

ALMOST simultaneously with the verdict of the coroner's jury in the Chelford railway accident, we have the Government Inspector's reports upon the collisions at Carlisle and Northallerton. Major Marindin's remarks with regard to the latter fatality cannot be very pleasant reading for the North-Eastern Company. The Chelford disaster might, doubtless, have been prevented had the station-master realised that the shunting operations were being carried on under such very exceptional circumstances, that exceptional precautions were needed to ensure the wagons remaining where they were placed. But at Northallerton the accident was due to lack of ordinary precaution, and the blame does not rest upon one official only. It will be remembered that during a fog, an up Scotch express, drawn by two engines, ran past several danger signals and into the rear of a goods train, the driver of the first engine being killed, and several passengers injured. The Board of Trade Inspector holds the dead man primarily responsible, but considers the other driver should have kept a better look-out; and, further, that when the fog came on, the speed of the train should have been much reduced. The fog-signalling arrangements of the North-Eastern are adversely commented upon, also the method of marshalling the carriages, and the overloading of the already delayed goods train. Finally, the action of the Westinghouse brake is pronounced unsatisfactory—so far as reducing the speed of the train is concerned, although it is spoken of as having done good service in confining the damage to the first few vehicles on the express. No railway company should be content with less than perfection, as near as may be, in the vital matter of fog-signalling, and we have no doubt that the North-Eastern will have already taken steps to improve their system where it may have been found inefficient. As to another suggestion made by the Board of Trade Inspector, the duplicating of main lines in order to ensure a clear run for expresses—this is one of those expensive improvements in which the pressure of competition often provides a keener spur than considerations of public safety; but it would be very satisfactory if Major Marindin's recommendations should induce the North-Eastern directors to give this matter their early attention. It may be safely asserted that those companies who have already duplicated large portions of their main lines will never regret the outlay, and if the North-Eastern Company were before inclined to hesitate, the accidents at Thirsk and Northallerton should serve to convince them of the desirability of taking Major Marindin's advice.

THE discussion in the London County Council on Tuesday in regard to the cost of painting Hammersmith Bridge should not be passed by without notice. In 1893 the Council decided to have it painted at an estimated cost of 1,000*l.*; 505*l.* was subsequently added to this estimate for extra work. The work was done by the Works Department of the Council, the final cost amounting to 2,186*l.*, or an excess over the estimate of 681*l.* If this extra cost had been incurred by a contractor, we should never have heard the last of it. Now that the estimate is exceeded by the Works Department of the Council it is passed over, though the excess cannot be defended. The work was of the simplest possible kind. So far as it is possible to gather from the discussion, the chief cause of the excess was that the work was done in the winter months; in other words, the ratepayers' money was wasted by work being done at the wrong time of year. Moreover, if the estimates of the

Council's officers are thus exceeded, what value can be placed on them at all in regard to the relative cost of work by the Works Department and by independent contractors? It was further admitted that the bridge was painted in 1888 for 855*l.*, and it was not in the least shown that the work was not then satisfactorily performed.

NOT many weeks ago the panic at a Belfast children's entertainment gave an opportunity for a general outcry as to the inadvisability of filling public halls with children unaccompanied by adults. Now, in our very midst, at the Charrington Hall, Whitechapel, we three times successively last week see some 6,000 or 7,000 children literally packed together, with only some sixty adults present. Of these some thirty figured on a conspicuous, but distant, platform, and thirty were distributed among the children. The age of the children averaged nine years. The occasion was a most kindly arranged treat by the *Pall Mall Gazette*, our contemporary, however, aware of the risk, and has the County Council no power to prevent recklessness of this kind? The hall is lighted by gas, and effects were tried by suddenly shutting off the supply and the showing off a Christmas-tree lighted by electricity. Surely that was simply playing with danger. On Friday there was quite marked gas-escape near the platform.

THE letter of Mr. Redgrave to the *Times* (concerning Portland cement), which we alluded a fortnight ago, has evoked several replies. The greater part of Messrs. MacEvoy & Holt's letter is practically identical with a communication from their office which has recently appeared in our own columns, but in conclusion they traverse Mr. Redgrave's statement as to the inertness of cement grains which are too coarse to pass a No. 80 sieve.* The experiment quoted by them, however, show plainly that such grains are of far inferior value to the fine flour of cement, and the experiments are certainly not enough to upset the conclusion to which many unbiased engineers have been independently led. Indeed, Mr. H. I. Bamber, F.I.C., in the *Times* of January goes so far as to say, that "it is a fact that all the cement which will not pass a 18 mesh sieve [= 32,400 meshes per sq. in.] is quite useless as a cement, and is no better than so much sand, if so good"; he adds that this inert matter amounts, "in cement ground to leave 10 per cent. residue in 50 sieve, to about one-half the weight of cement." The value of fine grinding is not universally acknowledged by engineers and architects, and Messrs. MacEvoy & Holt would do well to confine their attention to the real question at issue, which is the effect of the addition of ragstone, or other material to Portland cement after calcination.

THE German genius for statistics is illustrated in a registry in connection with population and house property at Berlin on a plan which might be of some value carried out in this and other capitals and assist house-builders in fitting supply to demand. At Berlin the increase of population, new houses, empty tenements, and fall of rents, mortgage transactions, &c. have all been registered by Herr Frank who has arrived at the following results. Berlin, on January 1, had about 1,724,300 inhabitants; there has been an increase of 34,000 souls during 1894; there are 22,000 sites in Berlin which have buildings on them, but there were only 231 new sites built upon last year; the total value of house property in Berlin is about 170,000,000*l.*, this figure being taken from the books of the municipal insurance office which enforces policies on all structures (distinct from contents); there are over 33,000 empty tenements at present in Berlin; the

* That is to say, a sieve with 80 meshes per lineal inch = 6,400 per sq. in.

are only 30,000 vacant at the beginning last year. In about 10,000 cases landlords lowered their rents last year. In 2,300 cases rent was raised. During the year no less than 232,000 families moved into tenements. There are altogether 449,000 tenements in Berlin, the rental value of which is about 15,000,000*l.*, this figure being taken from the lists of rents actually paid. There were 3,000 conveyances of house property last year; of these 2,000 were by deed and 400 by compulsory auction to cover mortgages. No less than 29,000,000*l.* were lost by mortgages last year, who had not too highly on property. In 1893 1,000,000*l.* were lost, and in 1892 19,000,000*l.* members of the building trades keep a register of bad debts in connexion with a black-book. The total owing to them is about 300,000*l.* Berlin house property is at present mortgaged to the extent of about 100,000,000*l.*, or 30,000,000*l.* above the rental value according to the insurance books.

IN his annual report to the Vestry of St. George, Southwark, Dr. Waldo, the Medical Officer of Health, touches on a great many points of contact between the responsibilities of the medical man and the building-owner or architect. Density of population is found to be directly connected, in his district as elsewhere, with high death-rate, and "density of population is materially augmented by a number of large, densely-crowded buildings which exist in all the sub-districts. These are the so-called 'model' dwellings." Among the exciting causes of diphtheria are said to be close aggregation in schools, with inefficient ventilation and floor space, and aggregation in block buildings and on their arcades and courtyards." Erysipelas gives best "where dampness, want of light, and stagnation of air are combined. The infection is commonly spread in underground basements." The water-cisterns of the "model dwellings" in the parish have been the subject of special examination. The following is Dr. Waldo's statement on this head:—

"The cisterns were, for the most part, on the surface, often imperfectly covered in, and in most cases within a few feet of the openings of the soil-pipe ventilators.

The latter condition renders the water liable to contamination by sewer poisons, and in this way might sow broadcast the germs of diarrhoea, typhoid fever, and cholera.

The water in the cisterns was frequently filthy, its surface covered with smuts from the chimneys, and in a few instances with a layer of decayed vegetable matter 2 in. deep, while the sides of the cisterns were coated with slime one-third of an inch in thickness. Many foreign bodies were found in the tanks. It is been reported to me that a boy was seen to wash his face and hands with soap in a cistern supplying a block. In all necessary cases I have served owners with notices calling upon them to remedy defects. Instant supervision, however, will be necessary to compel owners to cleanse periodically and to keep and repair the cisterns. In private dwellings I find an equally bad state of affairs. The cisterns are often badly placed, as, for instance, directly over water-closets or in areas near the dust-bins.

In a few of the 'model' dwellings I have induced the owners to supply water direct from the rising main. The cisterns, periodically cleansed, supply the water-waste preventers in the water-closets, and at times of need only, a screw-cock attached to the head of a pipe coming from the cistern and joining the rising main, affords a temporary and secondary supply. This system, particularly with a constant supply, is found to work admirably in practice.

This plan, however, cannot be applied in the case of 'lofty model' dwellings supplied by the Southwark and Vauxhall Water Company. The reason for this is that the company fails to carry out the obligations to provide water at the pressure clearly laid down in the 'special' or private Act, which would, more than reach the highest flat in Southwark."

The portion of the Report dealing with sewage-flooding in basements is serious reading. Owing to the inadequacy of certain main sewers in the district, cellars in which food is stored or prepared for human consumption have been, and may be again, flooded to the depth of as much as 50 feet. In reference to this matter a

correspondence took place between the Vestry and the London County Council. The latter suggested that the less costly remedy would be to fill up the cellars, rather than to enlarge the main sewer. No mention was made, however, of the question of compensation for disturbance to owners, nor did the Council state on whom it was proposed to lay the necessary costs involved by filling up the cellars. Further, no answer of any kind was given to the proposal contained in a previous Report that the Council should lay down a separate system of drainage for carrying off storm water. So there the matter remains.

IN a paper entitled "A Note on the Construction of Hospital Wards," read by Mr. John Sulman before the Adelaide meeting of the "Australasian Association for the Advancement of Science," a suggestion is made in regard to hospital wards in very hot and bright climates, for the provision of direct sunlight in sufficient quantities without foregoing the advantage of a verandah in keeping the walls cool. "External verandahs," says Mr. Sulman, "which cover both windows and walls, are effectual against heat and glare, but fatally defective in permanently cutting off the direct rays of the sun. A modification of this system, as seen at the Prince Alfred Hospital, Sydney, and elsewhere, is the reduction of the height of the verandah so that a small upper window gives direct admission to sunlight, and the remainder of the window and wall space is permanently shaded." In hot climates where there are nevertheless frequent cloudy days when sunlight is interrupted, Mr. Sulman recommends covering the greater part of the window by a movable hood, let down when the sun is powerful, and drawn up at right angles to the window when its glare is mitigated by clouds.

MR. C. WELCH, F.S.A., Guildhall Librarian, will edit, for the London and Middlesex Archaeological Society, their reprint of what is commonly known as Ogilby's Map of the City, 1677, engraved, in part, by Hollar. The map, "made by John Ogilby, Esquire, and William Morgan," is dedicated to the Corporation by the latter, "his Majesty's Cosmographer." On a scale of 1 in. to 100 ft., and measuring 8 ft. 2 in. by 4 ft. 2 in., it plots every separate building. The Corporation possess a MS. index, which gives a particular account of the streets and lanes in the City and liberties, directions for finding all the courts, yards, and alleys, churches, halls, and houses of note, and the name and marks of the wards, parishes, and precincts: this index, we understand, will be included in the reprint. An edition of the map was brought out, in eighteen sheets, by Robert Morden and Philip Lea, in 1732; a later one by De Wit. Whilst devoid of the skilful draughtsmanship which distinguishes modern cartography, Ogilby's map is a highly valuable piece of work, especially as being the first drawn upon so detailed a scale when they had begun to rebuild London after the Great Fire. But in saying that "nothing like it was attempted till the Ordnance Survey was made in this century," our usually well-informed contemporary, the *Antiquary*, seems to overlook the labours of, at least, Rhodes, Horwood, and Rocque. R. Horwood's survey of London, Westminster, and Southwark, about 2 ft. 1 in. to a mile, was published in thirty-two sheets in 1794-9, Ash being the engraver. It is dedicated to the trustees and directors of the Phoenix Fire Office, and is remarkable for the insertion of postal numbers of the houses, all of which are separately plotted, with their gardens, forecourts, &c., and in many cases their names. Horwood devoted great pains to his work: he undertook to prepare more detailed plates for those who might wish to have them, and announced his readiness to—

"Make new sets of Impressions to show changes in numbering if the Commissioners appointed for

that purpose and the Parishes think proper at any future period to make a regulation in the numbering."—(I'de the title-sheet.)

In 1807-13 W. Faden brought out a further edition, in forty sheets, and in 1819 a fourth edition, with additional area, of Horwood's map, "in which every dwelling-house is described and numbered." John Rocque's surveys extend over a few years in the middle of last century. His big survey, with a contracted plan for key, was engraved by John Pine, Blue Mantle Pursuivant, and chief engraver of seals to the King, in 1746, and was published also in colours; it forms the basis of Pine and Tinney's map, 1749, engraved by Basire and Seale, and of another, 1754, issued by Pine, Tinney, & Bowles, successors to Rocque's property in his original survey. J. Rhodes's view of Kensington, and the Gardens, Hyde Park, and Knightsbridge, engraved by J. Bicknam, and published July, 1766, is a striking performance, on a scale (about 40 in. to a mile) large enough for the delineation of every house, with doors, windows, chimneys, railings, and so on. Of Ordnance Surveys of London a skeleton-plan, 5 ft. to a mile, was published in 1848-50, and another, 1 ft. to a mile, in forty-four sheets, in 1850; the former, with the houses, &c., filled in, and historical sites down to 1688 marked, was issued in 326 sheets in 1871.

WE have received a circular in regard to a so-called "Art-Furniture Exhibition," to be held at the Agricultural Hall, from April 16 to 22. The following are stated as some of the objects of the exhibition:—

"The Exhibition is a commercial undertaking, organised for a business purpose; it is intended for the improvement of the relationship between the actual seller and the actual buyer, and to bring both in closer contact with one another; it is an opportunity for bringing principals in personal contact with their own customers, and many others who are not at present transacting business with them; to continue the important feature of bringing together under one roof every buyer and seller of furniture," &c., &c.

Where does the "Art" come in? Not a word as to the object of improving the design of "Art-Furniture"; not a word as to those who design and those who make the furniture; they are not taken into account at all. The whole thing is apparently a public installation of the middleman; and we wish it—exactly the success it deserves.

IT was worth while to make the exhibition of the collected drawings of Rowlandson which are now on view at the Society of Fine Arts Gallery, in Bond-street, as representing the work of a man who held an important place as a satirical artist in his day. But the impression left by it is not an agreeable one. Rowlandson was the Swift of pictorial satire, whose object seemed to be to throw contempt on human nature, and to represent men and women only in an odious and disgusting light. There is, unquestionable power in many of his caricatures, and perhaps some of them, such as the picture of "Jolly Jack Tars Carousing" (242), are (for their own day) not so very far from the truth. Others, such as "The Turtle" (8) are obviously monstrous and cruel exaggerations. Some of the portraits, especially that of "Miss Faren" (48), show a great deal of power of characterisation. In his sketches of town and country, many of which form the backgrounds to scenes illustrating the life of his day as he saw it (or affected to see it), Rowlandson shows a happy freedom in representing scenery and architecture in a light sketchy manner, conveying a great deal with little labour; and he handled his own method, that of pencil or pen sketching with light tinting, with knowledge and ready ability. But in general, whether we regard the exhibition from the artistic or the humanitarian point of view, it is one that we feel rather glad to get away from.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

A MEETING of this Institute took place on Monday last, at No. 9, Conduit-street, Regent-street, the President, Mr. F. C. Penrose, in the chair.

The minutes of the last meeting having been taken as read.

The President delivered the following address to students on "The Study of Buildings To-day and in the Past":—From the two preceding Presidents you have received at this period of our Session addresses of high professional value. These addresses, and especially the three last, occupy so large a field of the practical requirements of students, and I may say, not of students only, but of fully-fledged architects also—for indeed we should all be classed as students, and be brought within the definition which Michelangelo gave of his own position when he answered someone who wondered at seeing him, in the zenith of his fame, busy measuring a piece of antique detail, "I also am a student"—that it would be unnecessary and undesirable for me to enlarge upon it. I cannot, however, avoid repeating here and there what Mr. Anderson has so admirably brought before you, as when in his first discourse he rightly claimed for Planning the title of an art—for an art it is, quite as much as when a sculptor studies the anatomy and the skeletons of the figures of his groups, or when a landscape painter arranges the articulation of the limbs and trunks of the trees which he proposes to cover with foliage. I would strongly advise the younger students who did not hear the discourses I speak of, to refer to those numbers of the *Journal* which contain them, and not only to the address on planning which I have mentioned, but also to those later addresses on the reciprocal duties of students and commencing architects, to their teachers, their work, their employers, their professional brethren, and to themselves—qualities affecting character which are quite as necessary to success, or even more so, than intellectual or artistic power and learning.

Under the new regulations, a very important matter to any one entering the profession must necessarily be the examinations, which he must pass to qualify him for a place, in this Institute at any rate—and it is not unlikely that something analogous will practically come to be required of all architects. Care has been taken to make these examinations, whilst being a fair test of efficiency, yet not so severe as to be an inaccessible bar to any whose talents show real sympathy with the profession of architecture; so that the passage shall not be an obstruction to any one who, although only moderately endowed with natural quickness, is willing to entertain the one thing needful alike to him as to one with an intellect of the highest order, namely, fondness for the profession as the great aim in life, and the determination to secure the necessary steps by careful and continuous study. But it should be borne in mind that, important as is the passing of the examinations referred to, they should be considered not as the final end in view, but as the means of attaining it. And I specially mean by this observation that work of the nature of cram is to be discontinued. The examination questions are very properly published in the "Kalendar" as a guide to the sort of examination which the candidates are to expect; but it would be a very bad preparation to dwell too much on the confines, as I might call it, of such published questions, instead of study of a broader description. The examination may easily take such a turn as to defeat a partial preparation; but a candidate who has a good general knowledge is much less likely to be nonplussed. But whatever subjects are studied, whether in a broader or narrower circle, should be fully assimilated.

Dismissing these remarks on the door of admission to our ranks, I will endeavour to place before you some considerations which long experience has led me to think essential to success in design.

The very first thing for a student to acquire is the power of accurate drawing, the obedience of the hand to the eye, and the ready manipulation of the instruments he uses. These may have been already partially attained; if so, so much the better; but it is indispensable. I will suppose the student entering an architect's office. If in that office there are, as is probable there would be, clerks and senior pupils, the natural modesty of youth will perhaps incalculable an amount of shyness which will

hinder him from gaining from them, at first, sufficient information as to the meaning of what is going on; but in ordinary cases this shyness soon wears off, and he will find his seniors ready to give information, especially if asked for at convenient times. This manner of study was practically the only one available to aspirant architects when I first began my studies, and very few books were usually accessible. The only book in the office where I was a pupil was Peter Nicholson's Dictionary—a book I by no means undervalue, but mention to show how limited our literature was in those days. It is very different now. The extensive library of the Institute is open to you, and there are lectures of all kinds which you may attend. Still, the value of the instruction in an architect's office, especially in practical matters and construction, still remains where it did, as well as the advantage of the friendships which may be formed there with fellow pupils.

Passing through the copying stage, you will begin to sketch, whenever opportunities offer, from existing buildings. In visiting works in progress do not be shy of asking the clerk of works the meaning of what you see. You will seldom find him disinclined to give information. Some of you doubtless will join in the pleasant and profitable Architectural Association excursions. In these I may venture to offer some advice to students, drawn from my own experience at this stage.

Suppose you have come to study some ancient building of merit—I do not mean that the term would not be equally applicable to a modern building; but ancient structures are more attractive, and more likely to be visited for detailed study. The first inclination would be to get a note or sketch of everything that takes the fancy; and I find in my early sketch-books pages and pages of different objects too slightly drawn, and only now and then is there a subject sufficiently explained to be a proper memorandum of what I saw, and which then attracted my attention so much. It is better, instead of rushing to work in this way, to spend some time in the general examination of the building, and to write down as concisely as possible, in a clear hand, and not too small (remembering that the keenness of youthful eyesight does not last for ever), what you think to be the chief characteristic of the work before you, and not till then devote such time as is available to sketching. Try to make your sketches as accurate and clear as you can. If there is time for a general view to be finished adequately, it may possibly be the most valuable; but if not, choose such piece or pieces of detail as can be properly rendered. Endeavour to get an accurate outline, together with plans and sections of mouldings; never mind how much time and how much use of india-rubber it may require, rapidly and artistic effect will come with practice. Leave your sketches alone when you leave the place; or should any relaxation be allowed to this rule, it should be limited to what may be done at the first resting-place, before the distinct impression produced by what you have endeavoured to portray has been effaced from the mind. This distinct impression can hardly ever last more than a few hours.

We may ask ourselves, what is the great value of this power of sketching? Is it to store up plenty of material for copying? In respect to new designs, certainly not. For restoration of ancient buildings—on which I propose to make some further remarks—no doubt such sketches would be of great service, so far as they are accurate. The chief value of the power of sketching in designing new buildings I conceive to be twofold; one is, that facility in sketching gives an architect readiness in designing in perspective concurrently with his geometrical elevations and sections; but the main advantage, as it appears to me, is that from familiarity with his own rendering of an existing building he can realise better the effect that a design from his own hand will have in execution. For this end you will see the high importance of accurate representation. Picturesque treatment is quite another thing. If the drawing is both accurate and picturesque, so much indeed the better; but of the two, accuracy is the needful quality. A design cannot win true excellence unless it is right both in form and colour. Form is the more important of the two, but injudicious combination of colours may spoil a well-formed design. When simple materials are used the colour can seldom be wrong; but when stronger contrasts are attempted, much care will be necessary. In sketching from nature, including buildings, too much attention to colour is apt to induce care-

lessness in respect to form. One of the finest and most truthful artists both in form and colour as a landscape and architectural painter I ever knew, the late Rev. John Pettit, was so much aware of this tendency that for three years of his earlier work he denied himself altogether the use of colour, and drew simply in monochrome. In studying a design where much colour is proposed I would recommend a complete representation in monochrome before any coloured drawing made.

It may be said that in architects' competition the picturesque style prevails, and is most telling. I believe that the committees who invite competitions are becoming aware of their weakness in this respect, and it is now not unusual to find among the conditions that "only geometrical drawings" are required.

During the earlier years of his education (whatever he may feel inclined to do afterwards) I should advise the student to make no use whatever of photographic apparatus. His object should be to impress the forms he sees upon the mind, to educate the hand to follow the mind's conceptions with rapidity and certainty; not merely to store up examples in portfolios, which can be of very limited use to him in comparison, I am not referring to collections of photographs by others, but to his own particular study.

Besides drawing and the practical studies of construction, &c., there are some subjects which the student should recognise as not unconnected with architecture, though any particular study of them is very rightly scarcely even suggested in the curriculum recommended in the "Kalendar." I refer particularly to two of these, which are very fascinating subjects for research, namely geology and archaeology, using those terms in their fullest sense. I am far from meaning that a student can be properly equipped if he is quite ignorant of those subjects; for no proper knowledge of masonry can be altogether independent of geology, and the knowledge of the different characteristics of Classical and Medieval architecture is not attainable without an acquaintance with general principles of archaeology; but the more detailed researches in such subjects may, for those whose inclination leads them to it, be left for future leisure; and, as "the wise housekeeper will bring forward out of his treasure things new and old," it will not be without profit for him to do so; but the old is mainly valuable for the sake of the new. Good architecture in all time has been the development of what has gone before, and unless the new is well keyed into the old, there is no reasonable prospect whatever of success. Too close an adherence to the past is also to be deprecated, but on different grounds. There is, however, one exception to this last remark. I refer to the case of those who may be engaged in the restoration of churches and other ancient buildings. In works of this nature archaeological conditions should be paramount, or only controlled by the requirements of divine service or other necessary use; but it should be historical archaeology, and not selective. In restorations it is scarcely possible to be too conservative. It has not unfrequently happened in church restorations that valuable historical links have been sacrificed to the preference of the characteristics of some particular period. True loyalty to historical succession, and attention to the advice given in the papers on the subject which have been issued on the authority of the Institute, will almost always point out the right path; but as cases of difficulty might arise, I should recommend a commencing architect, who finds himself face to face with a difficulty of this kind, to put himself in communication with the department of the Institute under which this subject has been considered; and from this body a *bona-fide* communication would be sure to receive a courteous and careful reply. If additions have to be made to old buildings of various styles, the circumstances will generally point out which of these styles ought to be followed. The architect, however, should not allow individual fancy to prevail too much in selection, but should endeavour to put himself as much as possible in the position of a surviving partner to the designer of the original building, and should think at least as much of his predecessor as of himself. In new creations of his own, carried out in any recognised style, I would by all means advise him, whilst inspired and guided by archaeological teaching, not to allow himself to be confined and hampered by it. The new materials and means now available cannot but lead us, as years go on, more and more away from the past; but to succeed it must be done, not by revolution, but by evolution.

To sum up in a more succinct manner what I

* The addresses have also been published in the *Builder*.—E.V.

ever said on this subject, the student and commencing architect should be so far an archaeologist as to study and endeavour fully to understand the development of the Classical styles of architecture from the best Greek period to the decline. The Roman variety, with its important accessory the arch, its earlier and better phases, and final corruption. The Mediaeval styles which followed, especially our English development on the Norman to the Tudor, taking cognisance of the associated arts of sculpture and painting of those periods. But with respect to the special domain of antiquaries, such as painted vases, paleography, coins, jewels, and heraldry, he must remember that art is long, and life short. Nevertheless, should his inclination lie that way, there is no reason against his indulging in the hope that at some future time he may have leisure for a more complete examination of them. If architecture be well studied, factually and historically, sufficient general knowledge on the necessary archaeological points connected with it will come in its train. A detailed knowledge will not assist him in his art, did it may absorb time better employed—at first, any rate—in practical construction. I have no site to undervalue the study of archaeology; but as it has become a much more favourite study than formerly, and is itself an absorbing and fascinating subject, all I wish to point out that it is not one of the primary desiderata for our students, except so far as it tends to him in connexion with the history of architecture. One of the more abstruse parts of it, as well as the other allied sciences to which I have made allusion, it is better to be content with the advice of specialists when occasion for it may arise.

One of the most important considerations at the outset of architectural study is to entertain notions respecting materials, not only as regards strength and durability, but as to their proper employment; and this is especially the case when we consider the number of new materials which are now available. I am not visiting the patronage of novelties, but of such have already won the favour of practical men. The actual building it is well to remember that first studying all reasonable economy, which is a duty in almost every case, sufficient solidity of construction and well-chosen material, and a good shape, which generally involves but little, any, extra cost, are far preferable, and will give satisfaction both to the employer and the general public, than any effect to be obtained by ornament. To give a simple illustration: a plain money-stack, surmounting a roof of good timbering, is far more effective than an elaborately belled stack rising from a covering of the flimsy character of which we have now too much in the market.

In the earlier part of this century there was a bad abuse of stucco and Roman cement, which were used in situations quite unfit to endure the action of the weather and the test of time. Painted Corinthian columns, with their base moldings and capitals and other enrichments, were constantly executed in these materials, so that so as to have provoked a pasquinade in jest of the compliment paid to Augustus for having found Rome brick and left it marble.

Mr George he did the same, but did in faster; or he found London brick, and left it plaster.

It is a pity, and the stronger artillery used by Mr W. N. Pugin in his "Contrasts" and other writings, brought in the desire for more truthful materials, and plaster had to retire from the field of all works of any character, or at least to the congenial atmosphere of interiors. The action against stucco, however, was carried such a degree that it has been dispossessed even of its legitimate field, that of clothing in brick or rubble walls, for which it was formerly used by the Greeks, the Romans, by great architects of the Italian revival, and constantly in Mediaeval works—for instance, by William of Wykeham—as an external coating of walls. Plaster surfaces should indeed never be used so as to pretend to be anything different from what they are; they should only be employed when desired to cover rubble or even brickwork, and when so treated should be blocked in imitation of ashlar masonry. Such restricted work as this the architect will find a good argument to offer, drawn both from common sense and authority. To the complete oscillation of the pendulum of fashion away from the use of stucco, I attribute a great mistake which has often been made in church restoration, which we too frequently find that the walls of the interior have been denuded

of their original coating of plaster, a covering which in ancient times was frequently adorned with frescoes, and which might very properly be so treated now; and the walls so exposed exhibit a very forbidding aspect of confused pointing and general untidiness. But pray consider that, whilst I am calling your attention to the one legitimate use of this material, namely, stucco, I wish to object as strongly as any one possibly can against its improper employment. Let everything which has to endure strain and pressure or the searching of the elements be of better material, as well as everything that is to show the hand of the artificer in carved or moulded work; which had better be left out altogether than be displayed in external work at any rate as mere cast repetitions. I do not include terra-cotta in this general condemnation. It is not a new material, though its extremely fashionable (and, I might add, hackneyed) use is comparatively new. The objection to the mechanical repetition so disagreeable in plaster enrichments does not apply so strongly in terra-cotta, because in the kiln a certain amount of variety is produced, and therefore both on this ground and because of its greater durability it is much freer from objection; but I consider that it should be used with greater reserve than it often is, and with more consideration for the fitness of the material with which it is to be associated. It may combine with an exterior otherwise mainly brick with excellent effect as a superior quality of the same nature. The old houses at East Basham, Norfolk, and Sutton Manor, near Ripley, in Surrey, are good examples of this kind. I do not think, however, it should be used in combination with rubble or flint walling; and I think also that it is out of place when the general effect is supposed to be of masonry, but with terra-cotta simply substituted for stone. But it is in the proper employment of steel and iron, where chiefly the new materials demand the exercise of thought; and this question becomes every year more prominent. Iron has become admirably useful, and is constantly employed as a concealed material; but the time must come before long when for some classes of building it will have to take its own place in architecture; and the best way to meet this requirement may very fitly occupy the thoughts of the rising generation of architects. I do not pretend to have any practical suggestions to offer—I have never had to grapple with the problem. I am inclined to think that the proper treatment of shop fronts will bring about the solution; for there is now a marked contention between the ground-story, where every possible square foot of plate-glass is demanded, and the more usual and quasi-domestic character of the super-structure. Nothing is more dreadful in appearance than the façades which we often see with a display of solid architecture, where the orders and pedimented windows seem to rest, as if by magic, upon a surface of plate-glass, occupying the whole breadth of the front at the street level. In this contention the shop-front must, I think, carry the day, and the old-fashioned form of the upper stories will have to yield. How this is to be done I do not venture to advise, but it will, I believe, rest with you, gentlemen—our successors and, as I hope, successful future Fellows of the Institute—to work out the desired result. This you will do by always aiming at using building materials in the most natural way, and then truth of construction will produce a satisfactory result if directed with the intelligence which grows from proper study and a feeling for proportion.

The Institute has recently received in trust, through the liberality of the Duke of Devonshire, a fine collection of drawings by some of the old masters in architecture. I think it may be of advantage, for the purpose of directing still further your attention to them, to give a running description of some of these. There are several portfolios containing drawings by Palladio, the greater number of which seem to be authentic works by his own hand. There are also some by Vignola and some by Inigo Jones; all these deserve your attention. The larger part of Palladio's drawings consists in a very complete series of the ancient remains existing in Rome in the middle of the sixteenth century, and particularly the remains of the Baths. What I chiefly wish to remark upon is the style of drawing in these works.

The buildings are all carefully planned with a good supply of the leading dimensions. The principal lines only—including, however, everything of importance with reference to the general masses—are shown. There is no confusion. Sofits are never indicated by dotted lines. In the eleva-

tions and sections, tints, usually brown, perhaps sepia, are frequently used to denote shadows and recesses—pen-hatching more rarely; but whenever used, very lightly drawn, so as not to obscure outlines. When the scale admits of it, columns and entablatures are carefully drawn, and great pains must have been taken to insure the exactness of the proportions. The capitals and bases of columns are very cleverly indicated, so as to suggest roundness in mere outline. Portfolio VI., which treats of the Baths of Antoninus, has some admirably-drawn columns and entablatures to a good scale, with full detail of enrichments, with measurements and plumbs (in fact, complete working drawings); but there is no aim at picturesque effect. They are exactly what a carver would wish to have. No VII. is devoted, for the most part, to the Baths of Agrippa, of which the existing Pantheon formed an important part. This volume is chiefly remarkable for a bird's-eye view of Rome, with the buildings and ruins that existed in 1562. It shows St. Peter's in an unfinished state, with the drum of the dome in progress.

In Portfolios XIII. and XIV. are drawings of buildings designed by Palladio. In these we shall find some by his own hand, treated exactly as the drawings of Roman remains previously mentioned; but there are some drawn more mechanically. Amongst the latter are some made for the cloister of the "Convento di Carità da Andrea Palladio, Architetto, par Antonio Vesentini Veneto." In this portfolio is a geometrical elevation of the Church of the Redentore at Venice, scale of about 1 to 50, thoroughly well outlined, and a Corinthian and composite cap, evidently by Palladio himself, as complete as those already described in Portfolio VI. The portfolio also contains the designs for the famous Olympic Theatre at Vicenza. The principal drawing is rather roughly treated, especially as to the sculpture; and also a more mechanical version of the same by another hand.

Portfolio XVII. has several elevations sufficiently well drawn. One of a rusticated ground story could not be better.

The Chiericati Palace at Vicenza is well represented and accurately drawn. The angle columns—according to Vitruvius's rule, which must have been derived from Greek practice—are drawn slightly larger in diameter than the intermediate columns. The somewhat unusual feature of impenetrating columns, which strengthen the angles of the front projection, has a Classical prototype—viz., at Brescia, and also in the lately-discovered basilica at Lincoln and in some Romano-Greek examples in Asia Minor. The proportions of the Chiericati Palace are very refined, and I remember finding that in drawing it, it demanded as much exactitude as a Greek temple to convey any adequate idea of its character. There is in the same portfolio a rather rough elevation of the Valmerana Palace at Vicenza. Here I will make a short digression from my main subject to observe that the beauty of this design is little understood from a mere elevation, because all the strength seems given to the centre, and nothing but weakness to the angles. Fergusson, in his "History of Modern Architecture," criticises this design severely: "The angles, instead of being strengthened either by being brought forward or rusticated, are weakened by having two more stories of windows inserted, and instead of repeating one of the pilasters which encumber the centre, we have only a detached statue to support the general cornice, thus adding absurdity to weakness. We find, in short, in this design ornament utterly divorced from construction." I am inclined fully to believe that any architect who knows this building only on paper, in the published designs, or indeed in this very portfolio, must agree more or less with Fergusson; but it is a different thing when the palace itself is seen at Vicenza. The street in which the palace is built forms an internal angle at each end of the front, and the houses built on each side of the front butt solidly against these extremities, giving to each of the statues the effect of being placed in a kind of niche, so that they have a very different meaning in reality from what they seem to have when the design is looked at as of a detached building.

In one of the cases there are a few drawings by Vignola, which are well worth your attention. They are both highly artistic and practical. All is good explanatory drawing, and without any tricks of effect. Palladio's drawings have the same practical merits, but a higher artistic quality. If the executed buildings of the two are compared, Vignola will be found quite to hold his own. Many years ago I saw at Bologna an

interesting collection of drawings by several noted Italian architects of the sixteenth century (about 1560), being competition drawings for a west front for San Petronio. Among the designs were two by Palladio and one by Vignola. I find by a note made at that time that I thought the draughtsmanship of Vignola much the more artistic of the two great rivals.

In the same case with the Vignola drawings are some by Inigo Jones. These are for the most part more sketchy than the drawings by the two great Italians above spoken of, but a few are excellent specimens of draughtsmanship. I particularly refer to a finished drawing of Inigo Jones's famous water-gate. It is outlined in pen-and-ink, and slightly shaded by hatched work. This drawing is well worth the attention of those who prefer that style of treatment; but the Italian architects chiefly relied on a rather slight shading in monotint, which I must consider less likely to confuse the form of the outline than pen-and-ink hatching. Some exceedingly valuable criticism on the imperfections too often attending this manner of drawing was given in the Review of the Students' Work in January, 1893. There are several highly-finished drawings by Kent well worth examining. They are most carefully drawn and shaded—rather too deeply I think—in monochrome.

I have now the pleasure of referring to the magnificent collection of drawings illustrative of the Pantheon at Rome, by M. Chedanne, which has been so graciously lent to us for this occasion by the French Government, and of which we are looking forward to a description this evening by M. Chedanne himself, to whom we are most glad to offer hands of fellowship, and are not unmindful of the sacrifice of personal comfort he has made for us in coming over at this season of the year. Mr. Spiers last Monday gave us some outlines of M. Chedanne's work and discoveries, and has made us very desirous to hear further particulars from himself. Into the very interesting historical and archaeological points illustrated in these drawings I do not propose to enter; it would be foreign to the purpose of my address to-night. What I do wish to call to your attention is the wonderful elaboration and refinement of finish in these drawings, and the pains which must have been taken to ascertain and accurately, as well as artistically, delineate so much valuable detail as he has collected. I feel sure that these drawings will hold a high place amongst the collections of the Grand Prix works of the French Academy; but it is important for us to remember that almost every year works worthy of being collected with these are produced in France. Our best draughtsmen will be the first to recognise that we in England have nothing comparable to them. It is perfectly true that our architectural education does not lead us to aspire to draughtsmanship of such perfection, and there is nothing in this country parallel to the encouragement given to it by the French Academy in the Grand Prix Studentships. It is, moreover, in France the growth of many years of emulation; and I well remember the perfection of the French architectural drawings fifty years ago. And although I do not think that, considering our methods of education and our requirements, we should be justified in urging our students to attempt rivalry with such works as we see here to-night, it is well worth the attention of those who wish to improve their draughtsmanship beyond the utilitarian limit to examine well M. Chedanne's drawings for the sake of their stimulating effect. The drawings which it seems to me will be of the greatest benefit to our students are the fine outline drawings, such as Nos. 21, 23, and 30. But from the exquisitely shaded works, such as Nos. 4, 6, 9, 10, and 11, there must be many valuable hints to be obtained. The very creditable drawings in outline by some of our students this year assures me that they, at least, will not examine M. Chedanne's drawings without profit. Extraordinary indeed is the difference between Palladio's simple handwork and these finished drawings. A sound, practical *vis media* between the two seems not to be unattainable by us, which, if we can reach as I hope we may—the kind courtesy of our French contemporaries will not have been lost upon us.

Mr. R. Phené Spiers then read a short description, based on M. Chedanne's Report submitted to the Academy of France, in regard to some important points discovered by him in his examination of the Pantheon. Before commencing the work of restoration he had noted that the axes of the small altars, which formed the

chief elements of the interior decoration, and those of the circular niches or apses, formed in the thickness of the wall, were in the same line. This fact gave proof that the builder of the edifice was also its decorator. His researches commenced at the springing of the vault above one of the four rectangular chapels. On the removal of the stucco decoration of three coffers of the lower range, three small arches were exposed, whose springing was vertically over the columns of the ground floor, whilst that of the greater arch, which enclosed them, rested on the piers on each side. The surface of the bricks proved that these small arches had been built in, to accord with the design of the coffer, and not cut afterwards, as might have been supposed. A hole which he was enabled to cut at a higher level opposite the top of the greater arch showed this arch to be vertical. This at once disproved the hypothesis of Piranesi, that this greater arch formed part of a series which constituted the outer skin of the cupola. Further examination also disproved the assumption that the dome of the Pantheon was constructed in light porous stone and pottery, and would not be able to carry the bronze flower bosses in the centre of the coffers and on the ribs, as he found bronze cramps built into the solid vault to carry these features. The whole vault was, in fact, built in solid brick, and supported at its springing by the great vertical arches already referred to, which were carried through the thickness of the wall, rising outside to the top of the circular wall of the building. The whole thickness of the vault was built in brick laid in horizontal beds, at all events, up to the level of the third range of coffers, as ascertained by M. Chedanne; the same horizontal bedding of the bricks also being found in the proximity of the central opening in the vault. This threw altogether new light on the construction, and although it bore out the theory put forward by Professor Middleton, that the whole vault was solid and exerted no thrust, this was due to a totally different cause—viz., the horizontal bedding of the bricks of the vault, and not to the cohesive properties of the concrete mass of which it was supposed to be composed. The reference made to the springing of the small arches in the vault and their position exactly over the columns of the ground-story emphasised M. Chedanne's argument that the decoration formed part of the original and main construction, and that the columns in question, which had been assumed by most writers to be decorative features and added at a later period, form part of the integral construction of the rotunda. The numerous relieving arches which M. Chedanne showed in drawings Nos. 15, 16, and 24, were all necessary constructive features in his estimation, and the cutting through of some of them by Dori in 1747 led to cracks in the superstructure. The removal of some of the bricks from the main vault was facilitated by the cracks already existing there, and he noted they were stamped with dies known to be of the time of Hadrian, and of the probable date of 123 A.D. Mr. Spiers then went on to recapitulate the reasons, some of which have been already referred to in our columns, for M. Chedanne's conclusion that the portico had been rebuilt at the same time with the erection of the rotunda. The modillions of the cornice of the pediment were not equally spaced out—the decorated mouldings under them were cut irregularly by the existing joints—the bases and capitals of the pilasters inside the portico intersected in a clumsy way, not always being on the same level; and the right-hand return of the portico was not quite at right-angles with the principal front. Besides these minor details, the proportions themselves of the pediment afforded an unmistakable evidence that the existing portico was built of features taken from an earlier edifice. The height of the pediment was a little more than a quarter of the width of the front—a proportion satisfactory in a tetrastyle portico like that at Pola, but quite inadmissible, according to Vitruvian rules, in an octastyle portico. M. Chedanne considered that the original portico was decastyle. He was led to this hypothesis by the discovery that the modillions in the raking cornice of the portico were not quite vertical; i.e., the stones had originally been cut for a cornice of a different rake from that of the pediment as it now stands. The inclination of the modillions was exactly that which would have occurred if a portion of a cornice of a decastyle portico had been utilised for the present octastyle one. At the apex of the portico it was necessary that a new block of stone should be cut to fit the older portions of cornice, used up with a raised pitch, and here M. Chedanne

found that Hadrian's builder showed his weakness. He did not even take the trouble to space out equally the modillions on each side, and the ornamental mouldings he carved under them were of the poorest kind. Following out the line of reasoning thus started, M. Chedanne pursued his investigations under the pavement, and succeeded in finding the original foundation wall, in travertine stone, of the extra column required to complete the original decastyle front.

The President then moved a vote of thanks to the French Government for the loan of the drawings and to M. Chedanne for coming over to this country at an inclement season, to give them the benefit of his learned researches. He considered it a great credit to the Institute and a great advantage to the architects of this country, and especially to those who belonged to the Institute to have these remarkable works put before them. In one of the rooms below there was a series of admirable drawings which by the courtesy of the French Government they had been able to exhibit in London, and which must be of very great importance to all students. It enabled them to see what could be done in the way of architectural delineation.

Mr. E. W. Mountford (President of the Architectural Association) said he was proud to have the honour of seconding the vote of thanks to the French Government and to M. Chedanne. He could assure M. Chedanne that they all admired the great patience evinced in his beautiful drawings, and they must all admit the great artistic merit shown in them. He was afraid it would be a long time before France would pass a similar vote of thanks to our Government. Their thanks were also due to Mr. Brydon, who had suggested the idea of obtaining the loan of the drawings from the French Government.

The motion was carried with acclamation, and the President, addressing M. Chedanne in French said, "Je m'empresse de vous informer que les Architectes Britanniques ont voté à l'unanimité leurs remerciements les plus cordiaux et respectueux au Gouvernement Français pour le prêt des dessins du Panthéon à Rome, dont vous êtes le bien habile et le très savant auteur."

M. Chedanne very briefly replied. He said, "Monsieur le Président, mesdames, et messieurs, je dois vous prier de m'excuser si je vous adresse en Français, ce que je fais avec d'autant moins de crainte que vous parlez ici ma langue aussi bien que moi. Je vous remercie du fond de mon cœur pour l'honneur que vous avez voulu faire à mon pays. Je n'ai pas le droit de m'arroger toutes les louanges qui ont été accordées, et je n'en accepte que pour la France et pour mes camarades. J'ai eu la chance de me trouver ici avec de si pauvres dessins, mais le gouvernement aura pu envoyer des dessins d'autres artistes plus méritants encore. De la part de mes camarades, de notre école d'artistes et de la France, je donne vous, Messieurs, les architectes Britanniques, et l'Institut Royal mes remerciements les plus chaleureux."

Mr. J. M. Brydon then delivered an address in which the usual review of the year's work of the students in competition for prizes and studentships was presented.

Mr. W. Emerson proposed a vote of thanks to Mr. Brydon for his interesting address, which was seconded by Professor Aitchison. The motion on being put was carried unanimously, and Mr. Brydon having briefly replied, the President distributed the prizes to the successful competitors. We published a full list of the prize-winners last week, page 27.

The President announced that the next meeting of the Institute would be held on the 28th inst. when Mr. J. A. Strahan, M.A., Barrister-at-Law, would read a paper on "The Legal Position of Architects in relation to Certificates and Awards." The meeting then terminated.

SMELLS IN CLEAN SEWERS.—We took the following from the annual report of the Borough Surveyor of Stockport, which has been forwarded to us.—"One peculiarity has been noticed while making investigations as to the cause of evil-smelling gases reported to exist in certain new sewers in the Edgeley district. These sewers have flushing-tanks in constant operation, and on being inspected at the time the complaints were made were found to be perfectly clean and free from deposit. From the circumstance it may be concluded that even in clean sewers foul odours are generated. The sewer in question only receive ordinary domestic sewage, rainwater, &c.; probably not more than a dozen water-closets are connected to them, and no chemicals or other manufacturing refuse find their way into them."

THE LONDON COUNTY COUNCIL.

THE first meeting of the London County Council after the Christmas recess was held on Tuesday, at the County Hall, Spring Gardens, Mr John Hutton, Chairman, presiding.

Painting of Hammersmith Bridge.—The report of the Bridges Committee contained the following paragraph:—

"In June, 1893, the Council decided to have the towers, the chains, the longitudinal girders, and the upper portions of Hammersmith Bridge painted, at an estimated cost of £1,000, leaving the inside of the towers and the under parts of the bridge to be painted in the following year. The Council at the same time directed the Works Committee to carry out the work, and for that purpose referred the specification and estimate to the Committee. The Works Committee in November following reported that it had considered the estimate and specification, and that it was satisfied with them. The Engineer has informed us that the final account of the cost of the work has been sent to him for certification, and that considerable difference exists between his staff and the Works Department in the subject. To the original estimate a sum of £330 3s. 4d. had to be added for certain extra work executed, particularly painting below the platform not originally contemplated when the work was undertaken. This the Engineer has allowed for at the full rates of the other part of the work which include scaffolding and the use of tools and plant. As, however, there was some extra expense on account of watching and boatmen's hire, the Engineer has allowed, in addition, the sum of £175, so that the Works Department states was the cost of the same. According to the accounts made up by the Engineer on the prices originally agreed to, the cost should work out as follows:—

	£	s.	d.
Contract amount	1,000	0	0
Extras (painting)	330	3	4
Do. (watching, boatman's hire, &c.)	175	0	0
	1,505	5	4

The Works Department claims to have spent—

	£	s.	d.
For labour	1,476	11	11
" materials, including cartage	41	2	2
" use and waste of plant	116	5	7
" establishment charges	182	12	2
	2,185	11	10

and thus it will be seen that there is a difference of 681l. 6s. 9d. One of the items in the estimate was 1,747 sq. ft. of gilding, at 3s. per sq. ft., total 2022l. 15s. In the final account sent by the Works Department there is a charge of gilding amounting to 385l. 6s. 6d., and as the quantity was unaltered, this gives an average price of nearly 7s. per sq. ft. The Engineer states that, however much quantities may differ in the execution of a work, it is not usual to permit contractors to enhance their prices should the work prove unremunerative at the contract rates. With regard to the cost for labour, this comes to 1,476l., whereas the original estimate for the total work, including labour and materials, was 1,000l. When the subject was further gone into, there was only one item of measurement that was in the slightest degree ambiguous, namely, that of 1,747 sq. ft. of gilding at 3s. per square foot. This part of the work is noted in the specification, and described as follows:—The portions to be picked out with gold shall be all those parts of the structure at present gilded. It is not disputed that the quantity of 1,747 sq. ft. has been exceeded, but what is disputed is, that owing to its being in narrow strips and scroll-work it ought to be charged at a higher price than was specified. The best way of settling the difference appeared to be to refer it to Messrs. Thacker & Sons, one of the three firms of quantity surveyors appointed by the Council to take out the quantities of the Council's works. This course was accordingly taken, with the result that Messrs. Thacker & Sons state that, having looked into the question of the gilding, and acting on the wording of the specification and bill of quantities, they must decide that only the price stated therein can be paid for the work done. It is clear that the Works Department was aware, before the commencement of the work, what was the character of the gilding to be executed, as it was the same as was on the structure. The Engineer has, as far as possible, dealt liberally in the matter of the painting of the bridge, and has allowed over 50 per cent. for extras above the sum at which the Works Department undertook to execute the work. It is owing, however, to the work having been carried out during the winter months, the sum paid for labour alone exceeds 1,476l., which no re-arrangement of the quantities can possibly adjust. We are of opinion that no fault is attributable to anyone. The instance is only one of those which must inevitably occur from time to time with the Works Department as with any outside contractor; that is to say, some works will, and some will not, be completed within the amount originally estimated. We recommend—

"That, subject to a supplementary estimate being submitted to the Council by the Finance Committee as required by the statute, the extra cost of 1,386l. 11s. 10d. incurred in the painting of Hammersmith Bridge be sanctioned."

Mr. Ward, the chairman of the Works Committee, said in painting works the estimate was often exceeded. For instance, seven tenders from contractors were received for painting the bridges of the Northern Outfall, the lowest being 270l., while the highest was 1,425l. Again, the highest tender for painting Abbey Mills pumping station was 1,597l., while the lowest was 398l. The chief reason for the increase in the case of Hammersmith Bridge was the fact that the work had to be done in the winter. A large portion of the work had to be painted six times instead of four, owing to the weather, and much of the gilding had to be gone over a second time. It was, moreover, one of the first jobs undertaken by the Works Committee, and was subject to establishment charges that amounted to 95 per cent.

Mr. Beachcroft said he thought that the winter was a most unsuitable time to carry out such work.

Mr. Sidney Webb pointed out that in the programme issued in view of the forthcoming election by the Metropolitan Union of Conservative Associations, it was distinctly stated that "public work undertaken by the County Council should be performed, as far as practicable, in those months when work in other directions is less abundant."

Sir John Lubbock, M.P., said that the Moderate party were all in favour of paying fair wages, but the original estimate had been based on the condition that fair wages should be paid. There was, of course, a desire to start works at times when many men were out of employment, but was it wise to do painting works in inclement weather? He had never made an attack upon the Works Committee. No one recognised more than he did the honesty and ability of its members, and the conscientious endeavours they had made to carry out the important duties entrusted to them. But his contention always had been that they could not expect work of that kind to be done by an amateur Committee, and the more the Council went on with the experiment the greater would be the loss to the ratepayers.

Mr. Charles Harrison (vice-Chairman), pointed out that the Commissioners of Sewers made their own harness and several other things, and that municipal work was carried out by other corporations, and nothing was said in those cases about amateur Committees "or about money being wasted."

Mr. Burns, M.P., said that the Committee had done the work in the winter in obedience to a resolution of the Council directing that, as far as practicable, work should be provided at such a time, it being recognised as the most scientific way of grappling with the unemployed problem, to pay men wages for work done rather than incur a larger expenditure in outdoor relief and private charity. A contractor might, of course, have made the job pay at the original estimate, but he could only have done so by putting on "sheepskin" instead of paint, and using varnish at seven instead of twelve shillings the gallon, if, indeed, he did not omit the varnish altogether. Were not all the committees "amateur"? On the Works Committee there were experienced experts like Mr. Ward, Mr. Lyon, Mr. Taylor, and Mr. Goodman; and what had the successful Finance Committee been but a body of enthusiastic amateurs who had the advantage of the expert opinion of Sir John Lubbock, Mr. Hoare, and Mr. Cohen? Beaten gold cost more than Dutch metal, and the Council, moreover, had used the best English white lead, which cost from 30 to 40 per cent. more than the stuff a contractor would have used. Again, the Council had had thoroughly efficient supervision, which cost money, instead of employing a bricklayer as clerk of the works. Much of the increased cost was due to the bridge having been painted underneath, which was not contemplated in the original estimate.

After some further debate, the recommendation of the committee was adopted.

Proposed New Approach to Richmond Park.—The Improvements Committee, reporting on a letter from her Majesty's Office of Works, again asking the Council to undertake the formation of a new approach to Richmond Park by the conversion of Priory-lane, Roehampton, into a public road, stated that the Council last May decided not to undertake the suggested improvement, as it was very doubtful whether the opening up of the lane for vehicular traffic would benefit any large portion of London, and the Council hesitated to incur an expenditure of some 11,000l. or

12,000l. in forming an approach to a park which was not under the control of the Council.

The First Commissioner of Works offered to make arrangements for opening the Roehampton-gate to the park subject to Priory-lane being made a public way, and expressed the opinion that the Council's estimate of 11,000l. or 12,000l. was unnecessarily high, and that the estimate of the Wandsworth District Board (5,000l.) was sufficient. He further suggested that the advantage to London generally of opening a direct road to Richmond Park would justify the Council in incurring an expenditure of at least 5,000l. After having given full consideration to the subject, the committee said they could not recommend the Council to carry out the suggested improvement at present, and they asked the Council to agree to a recommendation to that effect.

This was agreed to.

Sea-water for London.—Lieut.-Colonel Ford moved the following motion standing in his name on the agenda paper:—

"That it be referred to the General Purposes Committee to consider and report on the feasibility and desirableness of securing a supply of sea-water for London, with a view to its use for sanitary purposes."

Mr. Torr seconded the motion.

Mr. Burns said that, considering the Water Committee had the matter in hand, he thought it was no use referring it to the General Purposes Committee. To do the thing properly they would require 30, 40, or even 50 millions of gallons of sea-water a day, and they could not afford to do that.

The motion was lost.

District Surveyors and Buildings Erected in Contravention of By-Laws.—Mr. Hubbard (in the absence of Mr. Weir, M.P.) moved:—

"That, in the case of houses and buildings constructed in contravention of the by-laws of the Council and passed by a district surveyor, the Building Act Committee be instructed to report to the Council the name of the district surveyor who has passed such work, or allowed the use of improper materials, and also the name of the builder who has executed such work, or made use of such improper materials."

Mr. Taylor seconded the motion, which the Chairman of the Committee agreed to accept as a reference for consideration.

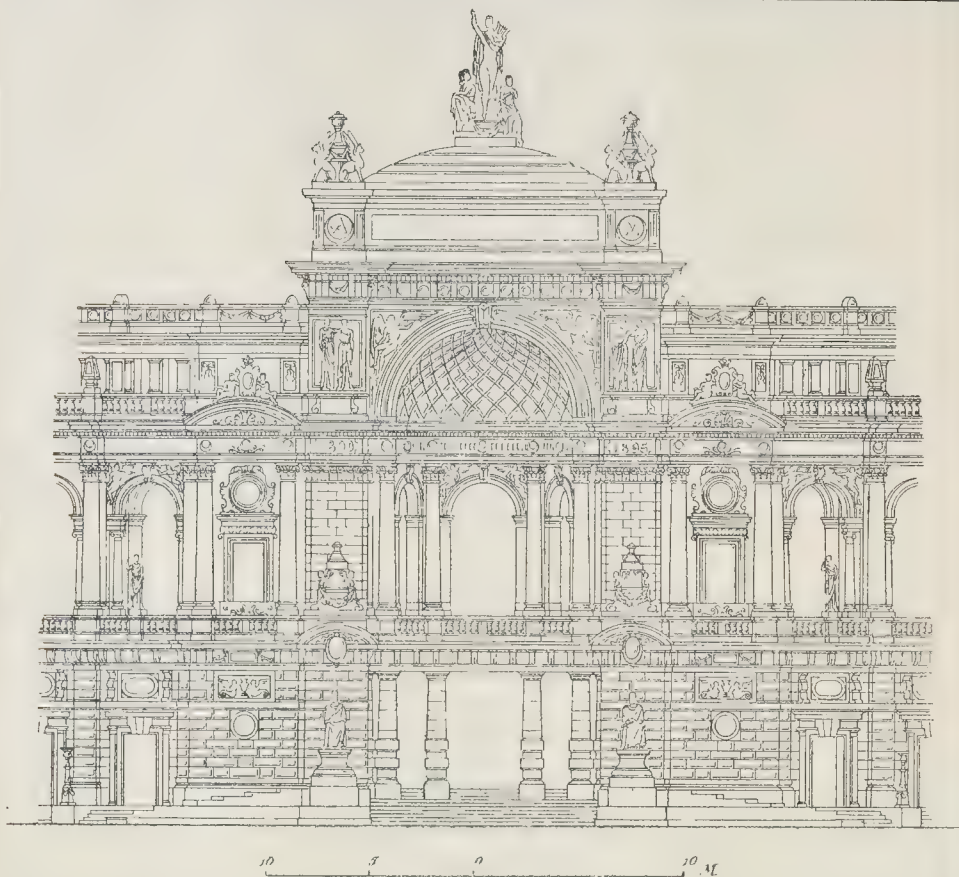
The Council soon after adjourned.

COMPETITIONS.

SCHOOLS, MOSS SIDE, LANCASHIRE.—A special meeting of the Moss Side School Board was held on the 9th inst. at the St. James's Schools, Barton-street, Moss Side, for the purpose of selecting the plans and designs for the proposed new schools to be erected by the Board in Upper Lloyd-street. Five architects had been invited by the Board to send in competitive designs, and these were now submitted for consideration. The Clerk (Mr. W. E. Rowcliffe) read the remarks of the assessor upon each set of plans. After some discussion Mr. Nasmith moved, and the Rev. W. Challenor seconded, "That the plans marked No. 6 be accepted subject to the small scheme not costing more than 6,200l." Mr. Birdsall moved as an amendment "That the plans marked No. 1 be accepted." Dr. Fraser seconded this amendment, which, on being put to the meeting, was rejected. The original motion was then carried. The following are the names of the competitors:—No. 1, Messrs. Potts, Sons, & Pickup; No. 2, Messrs. Royle & Bennett; No. 3, Messrs. J. R. Beaumont & Co.; No. 4, Messrs. Pennington & Son; No. 5, Messrs. Potts, Sons, & Pickup; No. 6, Messrs. Woodhouse & Willoughby.

SCHOOLS, WHITLAND, SOUTH WALES.—We are informed that out of twelve sets of designs sent in for an intermediate school at Whitland, South Wales, those of Messrs. Griffiths & Jones, architects, of Pontypridd and Tonypandy, have been selected, and they have been instructed to obtain tenders for the carrying out of the work.

PROGRESS IN ELECTRIC LIGHTING.—The *Electrician* for January 18 publishes a useful map of a portion of London, showing, by means of distinguishing colours, the mains already laid down by the various electrical supply companies for domestic use, exclusive of public lighting. The map shows the areas allotted to the various metropolitan companies and local authorities, the thoroughfares through which the mains are laid, the position of the supply stations, &c.



New Opera House, St. Petersburg: Central Feature of Front Elevation.

Illustrations.

THE MONUMENT TO GOETHE, BERLIN.

THIS monument, by Professor Schafer, one of the most eminent German sculptors of the day, is situated at the outer edge of the "Thiergarten" at Berlin, only about a hundred yards distant from the Lessing monument, which was illustrated in our pages some little time since.

The monument, entirely of white marble, consists of a well-designed architectural pedestal adorned with three groups of sculpture symbolising respectively Dramatic and Lyric Poetry, and Scientific Research. Of the two former groups we give separate illustrations; we could not easily find place for the third without reducing them to too small a scale. The monument is surmounted by a portrait figure of the poet about 10 ft. in height. The figure is dignified in pose, and the monument has the merit also of grouping well as a whole.

The illustrations are from photographs by Herr Rueckwardt, of Berlin.

THE NEW OPERA HOUSE FOR ST. PETERSBURG.

We give this week the longitudinal section from front to back of this immense projected opera-house, which is perhaps of more interest than the exterior elevation. A plan of the main floor is subjoined, together with portions of the front and rear elevations to a larger scale than that of the general elevation.

In our last number the entrances and the distribution of the staircases were described. As

will be seen from the subjoined plan of the main floor the foyer accommodation predominates on this level to the same remarkable extent as the lobbies and vestibules on the floor below. The great central foyer (curved in plan), however, serves more as a large hall than a foyer proper. Two side foyers fulfil the requirements of promenades, and there are two refreshment-rooms and a smoking-room in connexion with these. The curved central hall which would make such an admirable promenade, as in the case of the Dresden and Odessa Opera Houses, is unfortunately broken up by the grand staircase, which is intended for the State visits of the Czar. Both the late Czar and the author of the design, Professor Schroeter, recognised the disadvantages of the central stairs, and it is not unlikely this feature will eventually be cancelled. According to some notes on the original plans, from which the illustration has been prepared, the late Czar proposed having one of the minor grand staircases so arranged that it could be easily reserved for his State visits. This would allow of a very imposing spectacle when the Imperial procession moves from the end of the curved hall to the grand royal box in the centre. This box, as will be seen from the plan, has a small ante-room, but it is intended to use the central hall for the Czar's receptions and "court." Just opposite to the entrance of the royal box is a spacious segmental loggia, from which the Czar can acknowledge any public demonstrations outside. Side loggias then afford accommodation for spectators.

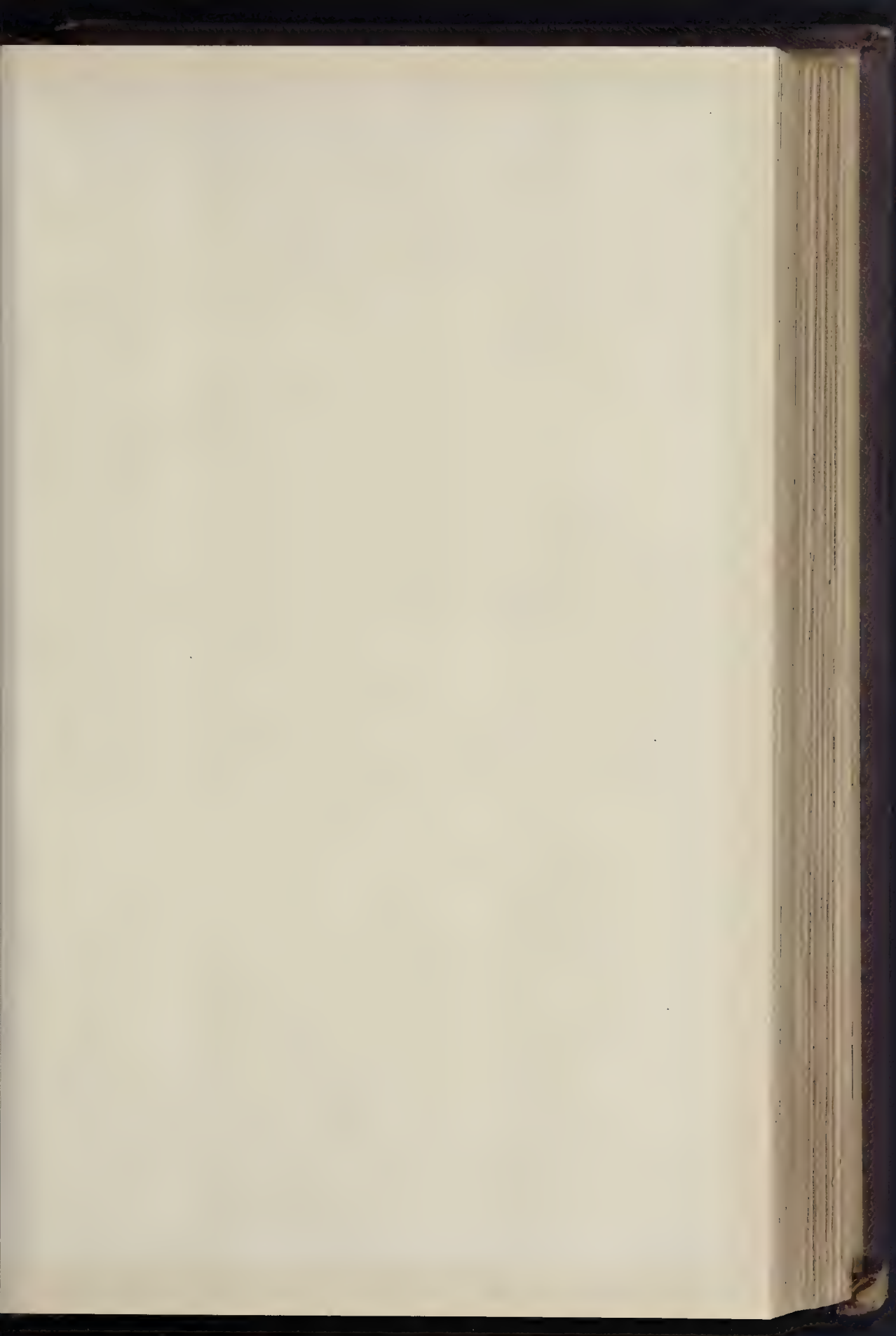
As will be seen from the plan, the Czar's private box on the first tier has its own spacious ante-room and reception-room, and the private staircase shows ample dimensions. There is a pass-door between the ante-room and one of the large side foyers for exceptional circumstances. Just below the Royal box is the so-called *incognito*

box, which is generally put at the disposal of the younger members of the Imperial Household. This box has its own reception-room, and there is the usual pass-door to the stage. On the opposite side of the auditorium boxes are reserved for the Lord Chamberlain and the Theatre Administration, and these have their own entrance, staircase, and reception-rooms, but on a smaller scale than in the Czar's suite. A special "Authors' Box" is also provided on this side.

Referring to the large library and museum, which takes up the back of the building, it will be seen that the halls are curvilinear in plan, and are approached by two staircases. The grand stands for watching the military spectacles on the Champs de Mars, referred to last week, are arranged below the windows of the museum and library, so that the view from the windows is not blocked. A loggia for the Czarina takes up a central position on the same level of the windows, which together form what one could term the "boxes" above the stalls of the grand stand. The Czarina's loggia has a separate staircase.

As regards the architectural treatment, this can be judged of pretty fairly by our exterior elevation of last week and the portions of the front and rear elevations given in connexion with this article. The façades will be entirely of sandstone picked out with bronze. The architectural treatment of the interior, which is indicated in the section, shows the same avoidance of over-decoration as the exterior. The late Czar specially wished to have "Classical" surroundings.

Professor Victor Schroeter, the Czar's private architect and Architect-in-Chief to the Imperial Theatres Department, is responsible for the design, which, however, was most studiously supervised by the late Alexander III. Professor Schroeter,

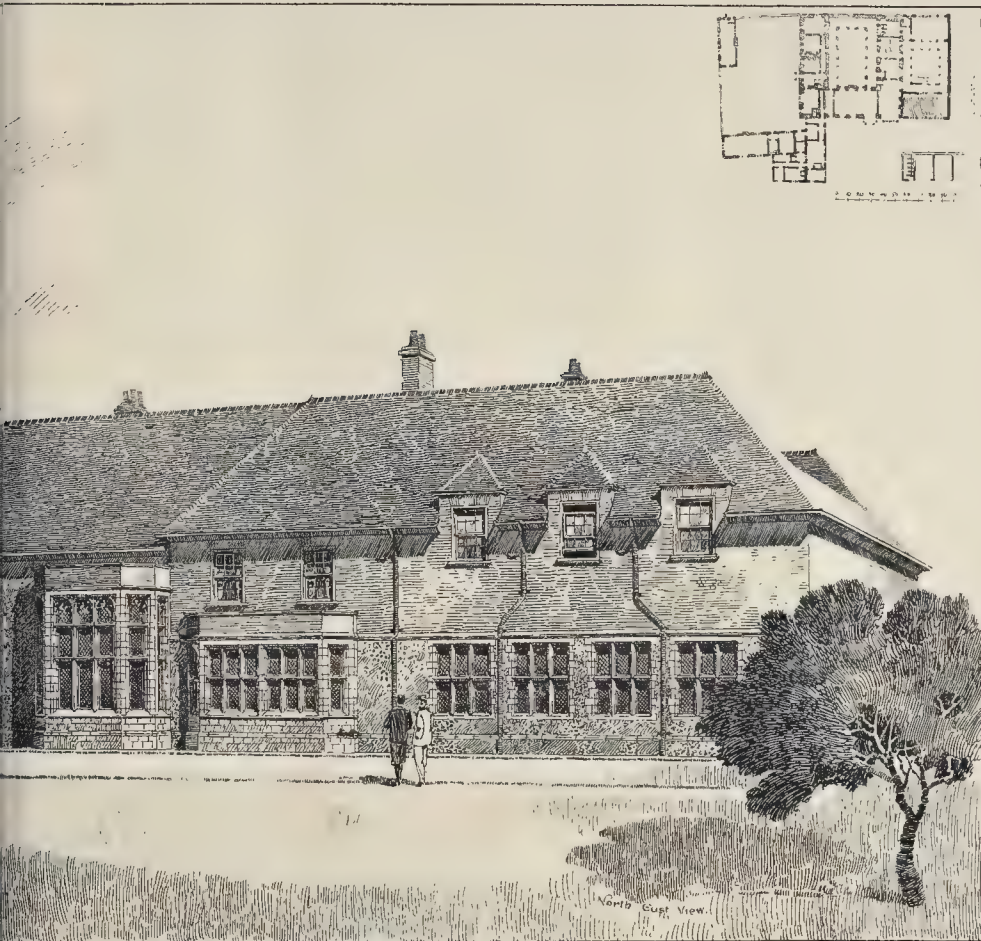




SOUTH EASTERN AGRICULTURAL COL



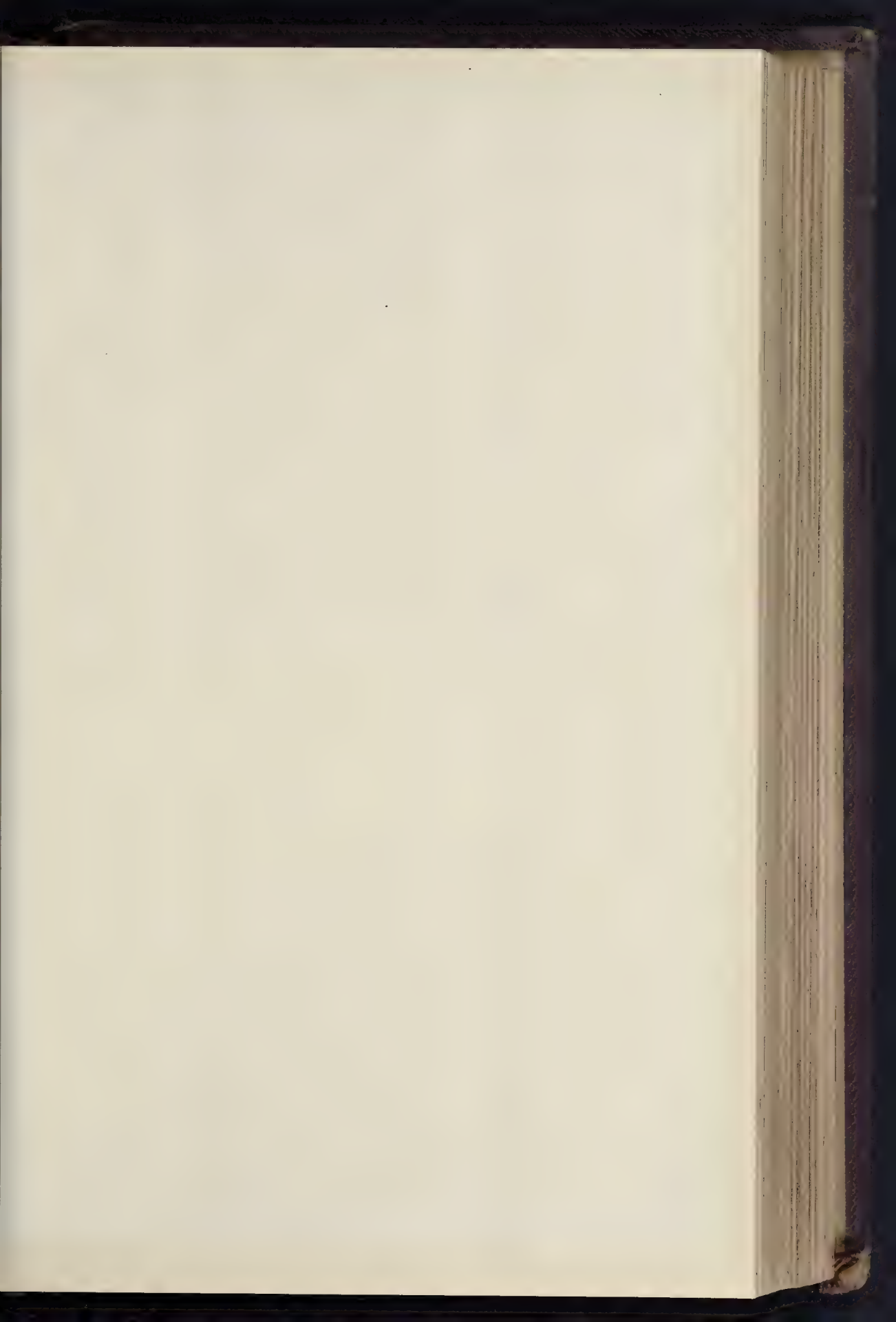
STABLES AND ENTRANCE LODGE, BIS



KENT.—MR PAUL B CHAMBERS, ARCHITECT

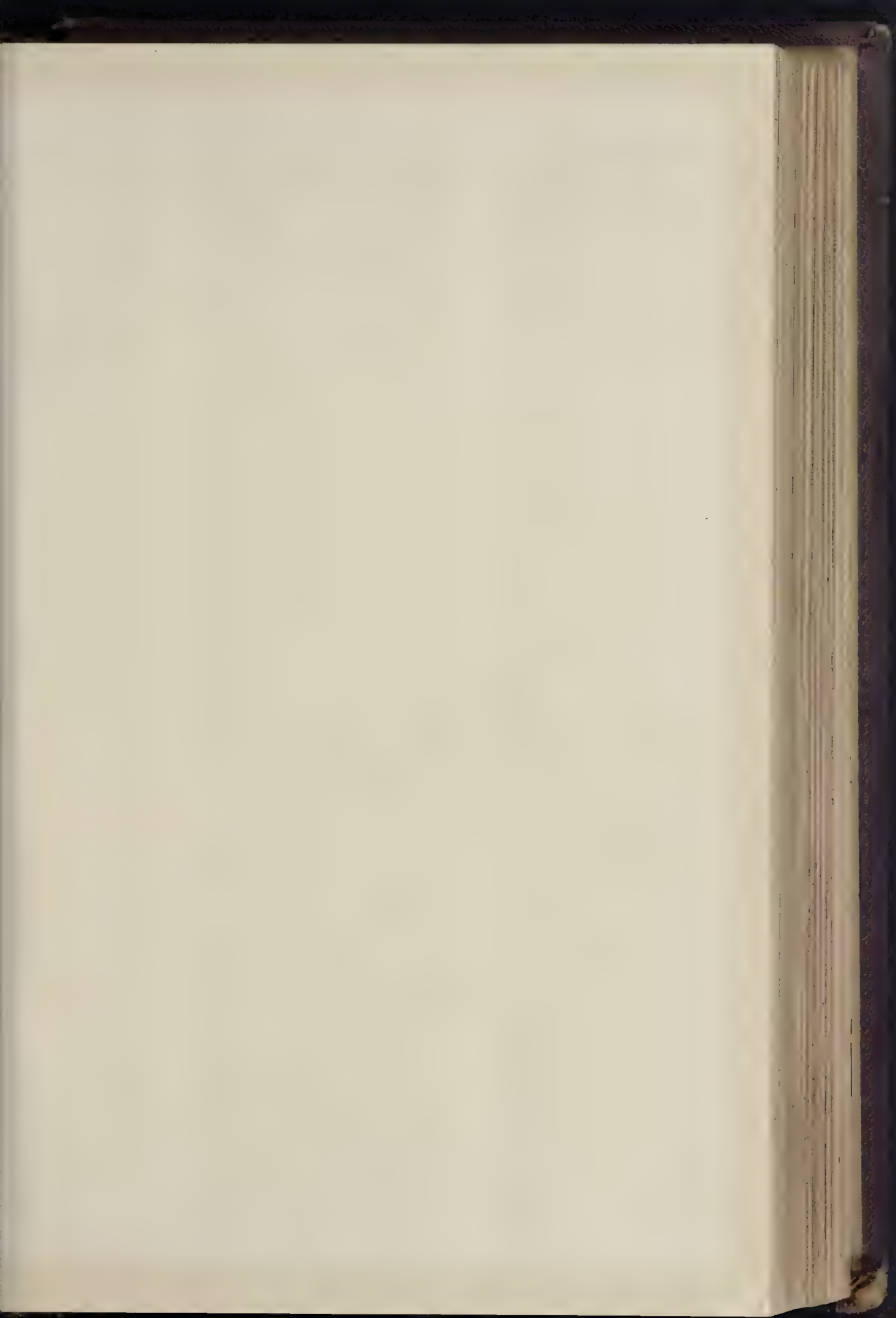


ES—MESSRS KIDNER & BERRY, ARCHITECTS.



THE BUILDING ANA 1-1895





THE BUILDER, JANUARY 19, 1895

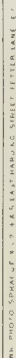


"LYRIC POETRY."

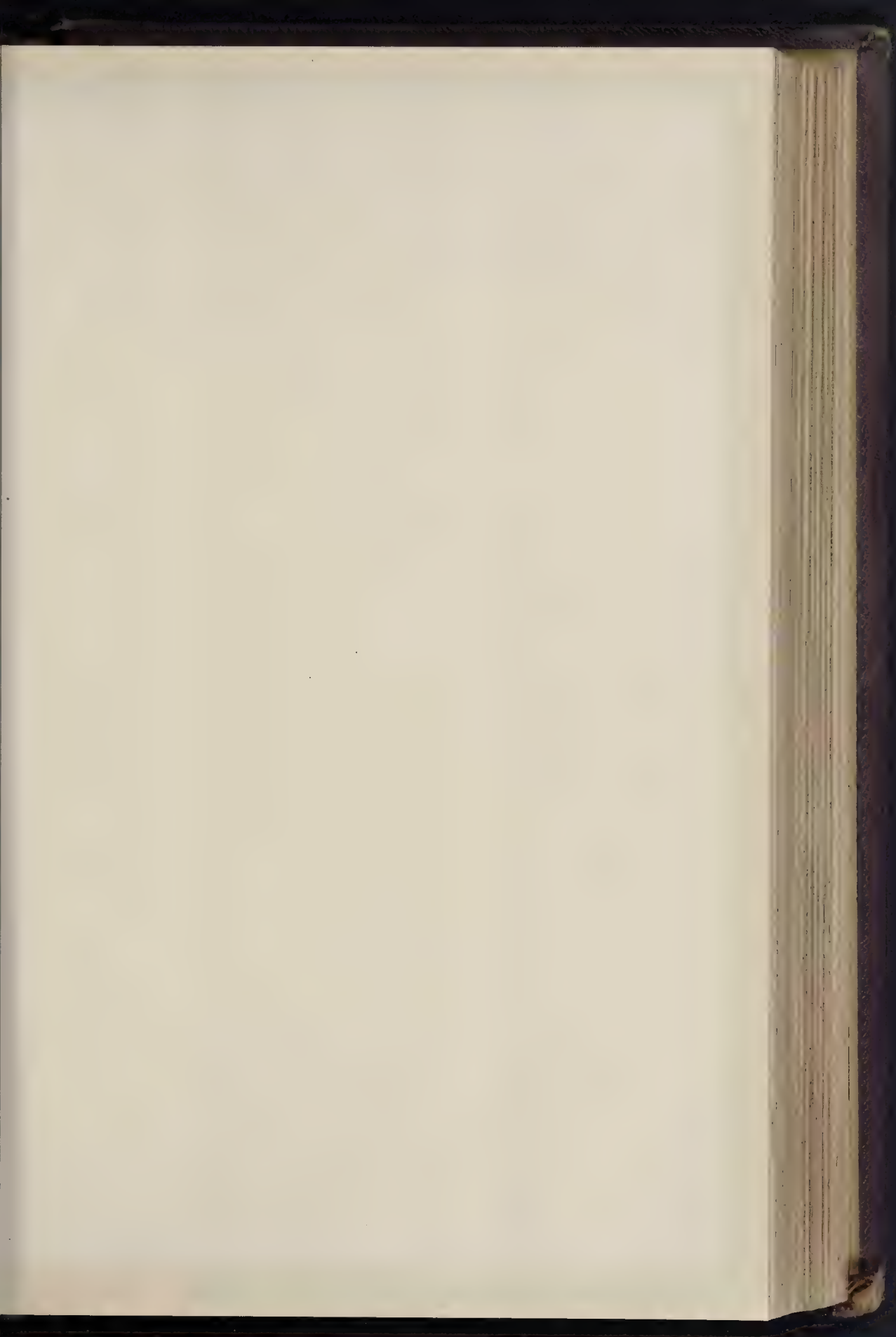


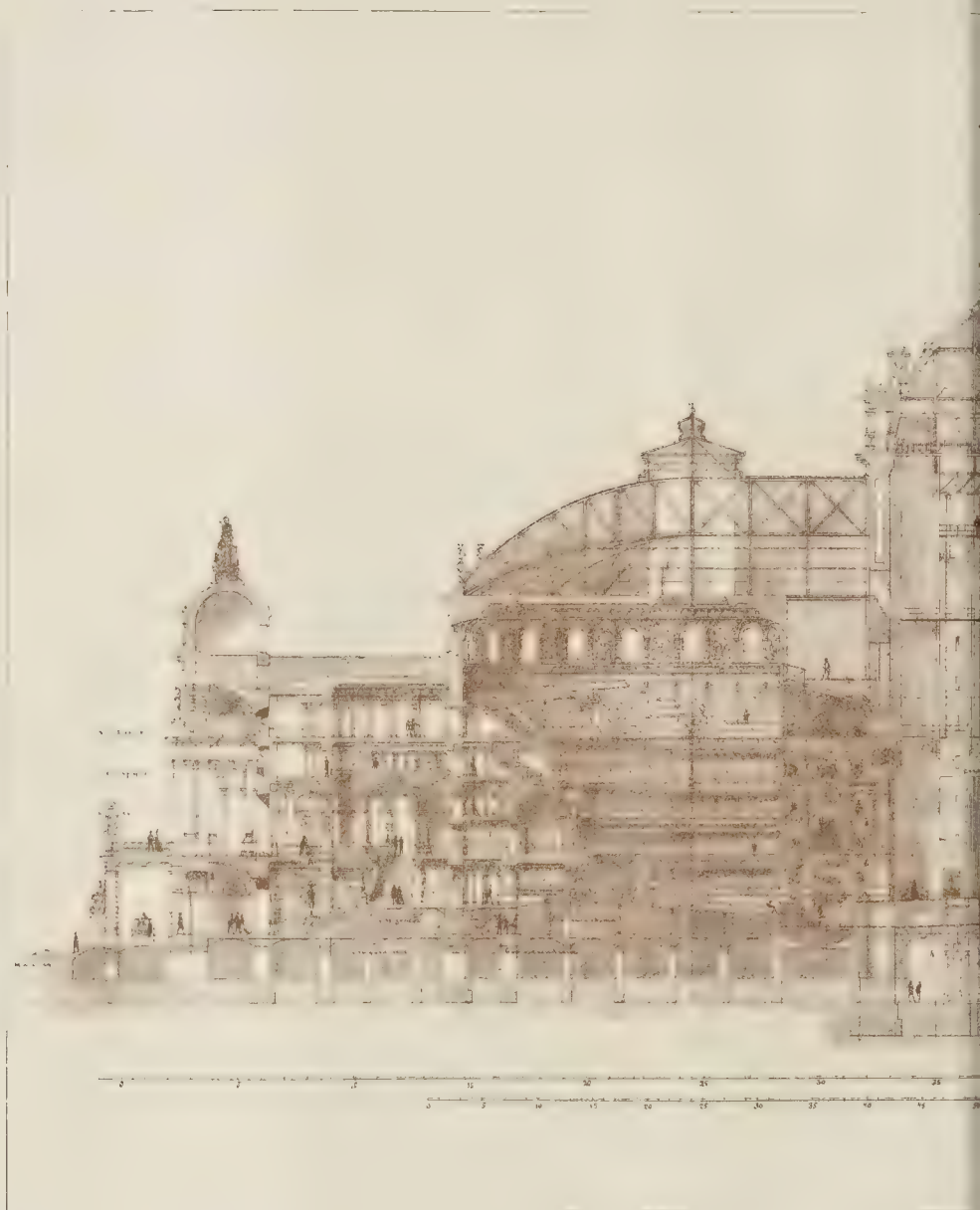
INN. PHOTO. SPRAGUE & CO. 4 & 6 EAST WARDING STREET, LONDON, E.C.

MONUMENT TO GOETHE, BERLIN.—PROFESSOR SCHAFER, SCULPTOR.

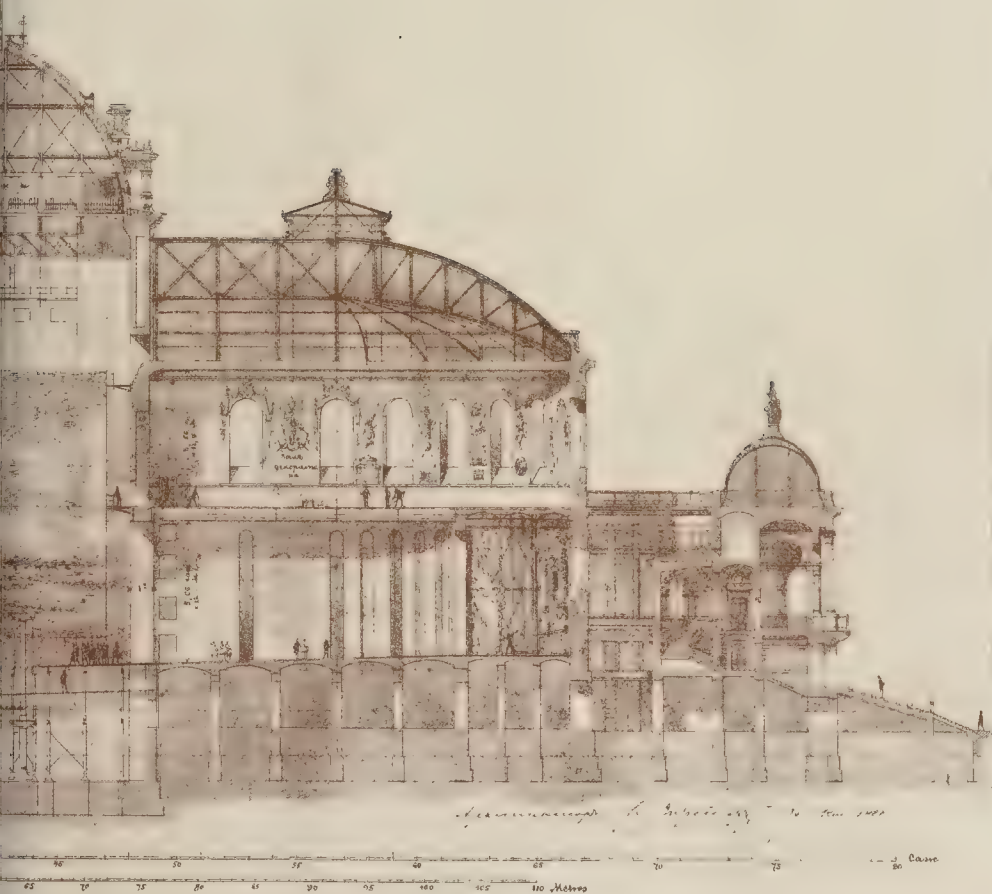
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SKETCHES BY MR K SHEKLETON BALLOUR, RIBA PUGIN STUDENT, 1894



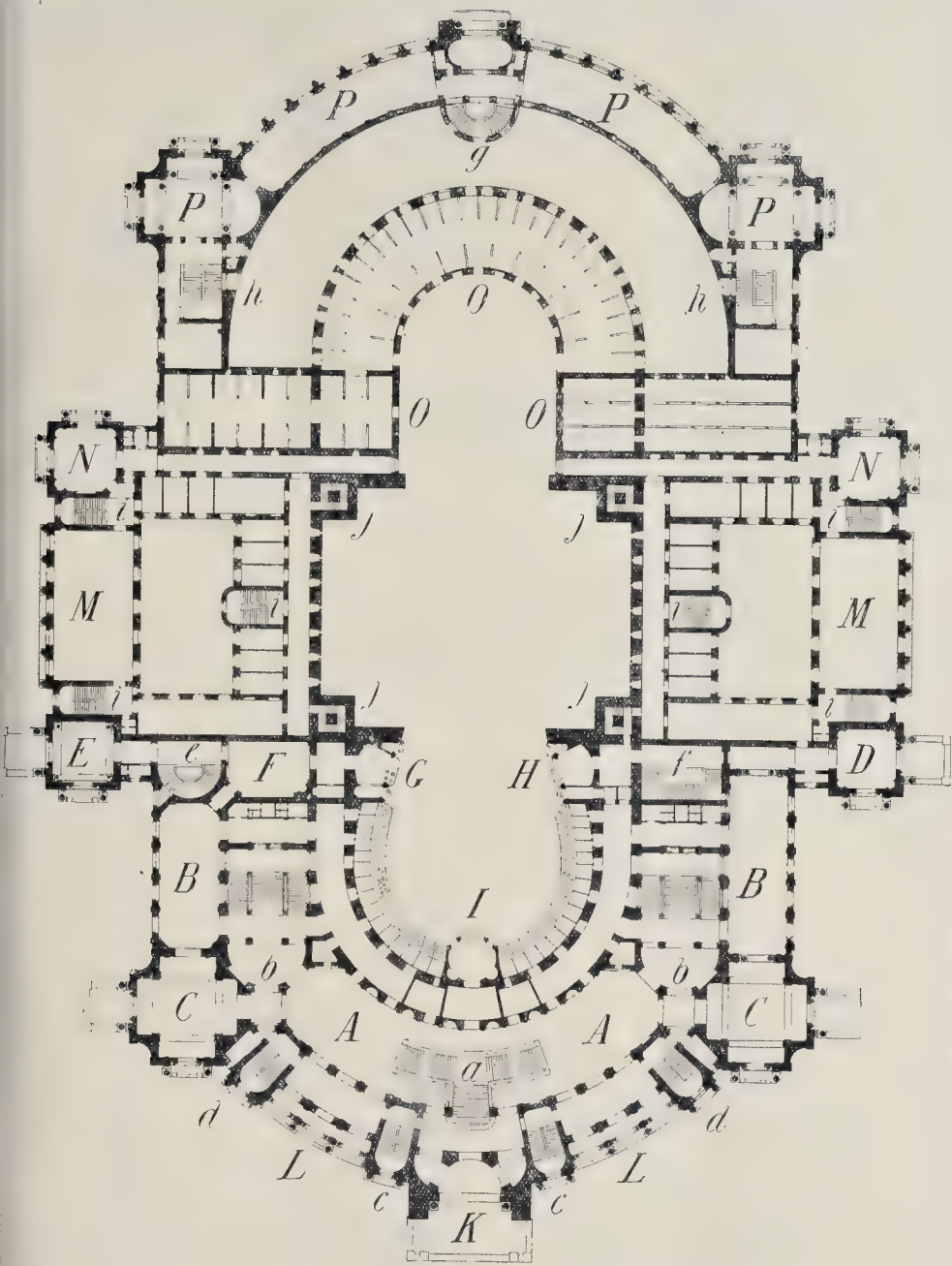


THE NEW OPERA HOUSE, ST. PETERSBURG



PH. PHOTO SPRAGUE & CO. 485 EAST HANCOCK STREET FETTER LANE, E.C.

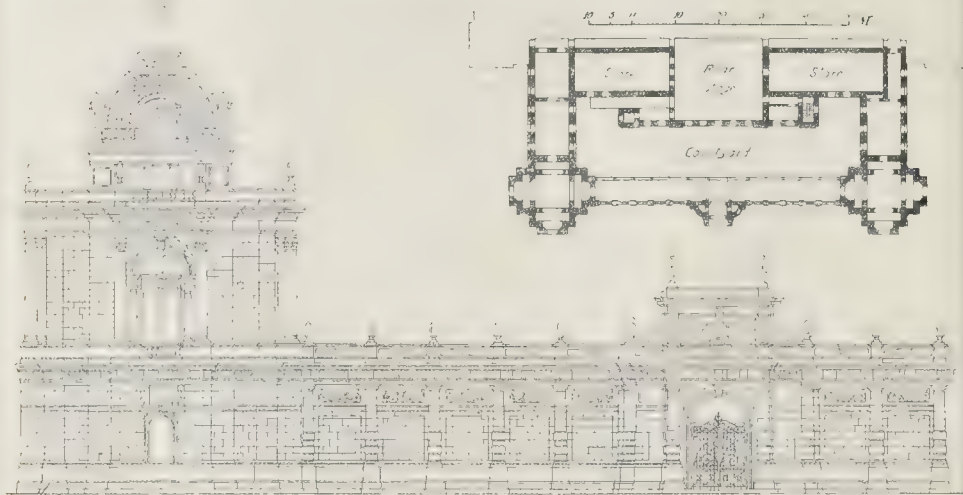
SECTION PROFESSOR VON SCHROETER, ARCHITECT



Plan of New Opera House for St. Petersburg.

PLAN OF THE HOUSE.

- | | | |
|--|--|--|
| <p>A Grand Central Foyer.
B Side Foyers.
C Refreshment Rooms.
D Smoking Room.
E The Czar's Reception Room.</p> | <p>F The Czar's Ante-Room.
G The Czar's Private Box.
H The Lord Chamberlain's Box.
I The Czar's State Box.
K Central Loggia.</p> | <p>L Side Loggias.
M Rehearsal Rooms.
N Green Rooms.
O Scene Stores.
P Dramatic Library.</p> |
| <p>a Grand Central Staircase.
b Minor Grand Staircases.
c Staircases to Third Tier.
d Staircases to Fourth Tier.</p> | <p>e The Czar's Private Staircase.
f The Lord Chamberlain's Private Staircase.
g Staircase to Grand Stand Loggia.</p> | <p>h Staircases to Dramatic Library.
i Dressing-room Staircases.
j Stage Carpenters' Staircases.</p> |



New Opera House, St. Petersburg: Part of Provisional Rear Elevation.

besides holding the responsible Court offices, has an extensive private practice in theatre-construction. Some of the latest examples of his work are at Tiflis, Rybinsk, Nishni Novgorod, and Irkutsk, in Siberia. EDWIN O. SACHS.

SOUTH-EASTERN AGRICULTURAL COLLEGE, WYE, NEAR ASHFORD, KENT.

THIS building is a much-altered 15th century foundation of monastic origin, having been built prior to 1446 by the great Cardinal Archbishop and Lord Chancellor of England, John Kempe, who had himself been born in the parish.

The Cardinal's foundation carried on its religious and educational work in the quiet enjoyment of its emoluments up to 1534, when the then provost

subscribed to the act of succession and king's supremacy, and the subsequent last provost surrendered all its possessions to the king.

Henry VIII., with the generosity born of easy acquisition, gave it away, "with all its endowments, jewels, and ornaments," to "Walter Bucher, Esq.," (Queen Katharine's secretary, from whom it passed successively through various private hands, until towards the end of the seventeenth century it became the property of the Rev. Sir George Wheler, Prebendary of Durham.

At his death, in 1724, he divided the buildings by will into two halves, leaving one for a grammar-school and the other to Lady Joanna Thornhill's Charity School.

Within the last few years it has been made over by the Charity Commissioners for the purpose of giving agricultural education under the County

Councils of Kent and Surrey, who have also leased an adjoining farm for the practical part of their teaching.

The original college of Kempe's times had lower walls of stone and a half-timber upper story. The timber work appears to have failed for in the middle of the eighteenth century it was bodily removed (with the exception of the oak kingpost principals), and brick outer walls were built over the undisturbed stonework below, and the internal arrangements greatly altered.

In order to adapt the building to its present purposes, a new quadrangle has been added of the north side, which provides a biological laboratory, with bedrooms over, and a lecture theatre. The infants' schools—a modern excrescence—have been converted into chemical laboratories, and



South-Eastern Agricultural College, Wye.—Ground Plan.

A—Ancient Priest's Door. B—Part of Old Chapel.

administration block added at the south-west end of the old building. The fine carved oak work has been rescued on its whitewashed condition, and an oriel window added to the refectory and library. The building contractors have been Messrs. E. Wallis & Son, of Maidstone, and the architect, Mr. Paul B. Chambers, of Brighton. The drawing was exhibited last year at the Royal Academy.

TABLING AND ENTRANCE - LODGE, BISHAM-ON-THAMES.

This illustration represents the side and back a group of buildings comprising stables, coach-houses, grooms' rooms, coachman's house, and the gate-keeper's lodge to a country house at Bisham-on-Thames. The base of the buildings is faced with red bricks, the walls immediately above being rough-cast; the upper portions are constructed in half-timber-work, and with brick-work hung with weather-tiling. The roofs are covered with plain tiles, and the stable-turret tiled with copper. Messrs. Kidner & Berry are the architects. The drawing was exhibited in the Royal Academy last year, but does not represent the principal front of the buildings.

SKETCHES BY THE "PUGIN STUDENT" OF 1894.

THE admirable set of sketches which represent the work done on his studentship tour by Mr. R. Skeletton Balfour, who gained the Pugin studentship in 1894, have been already referred to in terms of praise in our columns. The sketches which we publish this week are selected from those which Mr. Balfour submitted when competing for the studentship last year. Mr. Balfour sends us the following notes in regard to them:—

"*St. John's College, Cambridge.*—The view shows an angle of the second court, built 1595-1620. It is fortunate that restoration has been unnecessary to any extent, and consequently it presents a fine piece of colour. The large facaded windows light the hall, and the tower staircase, with the portuiculis over the doorway, leads to the combination-room.

"*Altdunale All Saints, in the Nene valley,* at rectory of which John Dryden was born, bears a strong resemblance to its not very distant neighbour Whiston, especially in its sturdy and stichal graceful tower and numerous gargoyles. The nave arcade and part of the chancel are Early English, the remainder of the church being chiefly Perpendicular. The chantry seen in the sketch was built in 1489 by "Wm. Chamber and his wife." The church, but recently well restored, has a couple of good brasses.

"The tower and spire of *St. Mary's, Stamford*, form a conspicuous landmark in this quaint old town of two counties, standing at the head of the main street leading up from the bridge over the Velland. The tower (Early English) and spire (Decorated) are singularly rich in ornament and detail, while the church proper, principally Perpendicular, has been recently fitted with a rood-screen and other furnishings by the late J. D. Sedding. In the chancel is the tomb of Sir David Phillips, with exquisite detail, much battered and worn, but kindly left unrestored."

THE ARCHITECTURAL ASSOCIATION: THE TECHNICAL TRAINING OF WORKMEN IN THE LONDON BUILDING TRADES.

A CONFERENCE on the technical training of workmen in the London building trades, convened by the Architectural Association, was held in the Meeting-room of the Royal Institute of British Architects, 9, Conduit-street, on the 11th inst., Mr. E. W. Mountford presiding.

The following are some of the principal items which were printed on the agenda paper:—

To consider the advisability of becoming a permanent Committee.

To consider how the necessary administrative expenses of the Committee can be met.

To consider the desirability of preserving a record of the proceedings of the Committee.

To consider the relationship of the Committee to the Technical Education Board.

To consider the existing opportunities for a London boy to obtain a thorough training as a skilled artisan, viz.:—

- (a) APPRENTICESHIP. Its gradual discontinuance, and its possible restoration.
- (b) TECHNICAL INSTRUCTION. Its proper direction, whether theoretical or practical; the character of the existing classes and

their comparative utility; the local distribution of the classes with relation to the needs of the district; the character of the supervision of the existing classes; the restriction of the classes to men actually engaged in the various trades, and the question of assisting the various teaching bodies.

To consider the action of the London School Board as to manual instruction of boys and the desirability of developing this work.

To consider the work that the City Companies are now doing for the improvement of technical education for men in their respective trades, and the question of assisting in the development and extension of such work.

To consider the influence of the trade unions upon workmanship, and the conditions under which men become eligible for election to the unions.

To consider the influence of the South Kensington Building Construction Classes upon workmanship, and whether a more practical system of teaching might not be adopted with advantage.

To consider the system of Registration adopted by the plumbers, and the advisability of extending this system to other trades.

To consider the desirability of discussing the overlapping of trades, and consequent disputes and strikes.

To consider the possibility of organising competitions among skilled artisans in the building trades of the Metropolis upon somewhat similar lines to the recent Workmen's Exhibition at Islington.

To consider the advisability of organising meetings of workmen to discuss questions bearing upon the workmanship of the various trades, and to arrange for architects to be present at and take part in those discussions.

The following representatives were present:—

Messrs. E. T. Hall, T. Cutler, and H. W. Burrows, for the Royal Institute of British Architects; Messrs. E. W. Mountford, W. H. Seth-Smith, F. T. W. Goldsmith, and Owen Fleming, for the Architectural Association; Messrs. M. E. Macartney and G. G. Frampton, A.R.A., for the Art Workers' Guild; Mr. T. G. Jackson, A.R.A., for the Independent London Architects; Mr. S. G. Bird, for the Institute of Builders; Mr. J. Verdon, for the Building Trades Federation; Mr. J. V. Eva, for the Operative Bricklayers' Society; Mr. R. Thurston, for the Amalgamated Society of Carpenters and Joiners; Mr. G. Cole, for the National Association of Operative Plasterers; Mr. C. Hill, for the United Operative Plumbers' Association; Mr. J. Thomson, for the Operative Stonemasons' Society; Mr. W. R. E. Coles, for the Plumbers' Company; Dr. Garrett, for the Technical Education Board; General Moberley, for the London School Board; Mr. A. L. Soper, for the City and Guilds Technical Institute; Mr. S. H. Wells, for the Battersea Polytechnic; and Mr. C. T. M. Millis, for the Borough-road Polytechnic.

The Chairman first proposed the name of Sir Arthur Blomfield as President of the Conference. He believed it would be agreed that Sir Arthur was a representative man, who would make an able President.

Mr. Goldsmith seconded the motion, which was unanimously agreed to.

On the motion of Mr. Hall, Mr. E. W. Mountford was next unanimously elected as vice-chairman.

Mr. Mountford, who occupied the chair, in the absence of Sir A. Blomfield, expressed satisfaction on the part of the Architectural Association at seeing so many of the invited representatives present that evening. The conference about to be opened originated in a paper, read before the Association some six months ago by Mr. Owen Fleming, upon the subject of the technical education of the workmen engaged in the London building trades. In the course of the discussion which followed, a resolution was agreed to that this conference should be held, and they had since then been endeavouring to get matters a little into shape. This was the earliest opportunity at which the conference could be held, and now that they had managed to meet he hoped some good would result. They had met in a perfectly friendly way, having nothing to do with any kind of politics or trade unionism. They looked upon the workmen as fellow-workers in the art of architecture and building, recognising that the interests of the architect and of the workmen should be identical. They also recognised that it was impossible to produce the kind of work the end of the nineteenth century should be producing, unless the architects and the workmen were at one in their determination to produce that good work. Some critics had said that the architects had better look at home and educate themselves before undertaking to educate others. Now that was just what the Architectural Association had been doing for the last fifty odd years. They had been devoting the

whole of their time to educating architects, and though they did not profess to have made such education perfect, they had been doing their best in that direction. If they could not turn out better architects it was not their fault, but it seemed to them there was something also wanting to be done to improve the technical education of the workmen. They did not quite know what was required, and they therefore thought the best way to arrive at some conclusion on the subject would be to invite representatives from the various bodies concerned, to meet and talk the matter over in a friendly way. He hoped by that means they might arrive at some conclusion which might be of benefit to all concerned. He would therefore call upon Mr. Owen Fleming, the writer of the paper he had spoken of, to give a short statement of the ideas of the Association on the subject.

Mr. Owen Fleming said he had been desired by the Sub-Committee of the Architectural Association, having charge of this matter, to briefly indicate the reasons, which, after prolonged and careful consideration, were held by the Association to be of sufficient importance to the building industries of London, to render highly desirable a conference of those bodies who were interested in the maintenance of a high standard of workmanship in London buildings. Before doing so, he wished, on behalf of the Association to extend a warm welcome to the delegates who had been appointed, and to express the hope that their deliberations might result in a diminution of those difficulties which now appeared to hinder the London boy from obtaining a thorough mastery of his trade. He thought that they might congratulate themselves, because, although they represented widely varying, and in some cases, possibly opposing interests, they were enabled to meet at that conference on the common ground of education, which stood entirely apart from the many grave questions affecting the relationship of capital and labour. These questions were entirely without the purview of the conference, and he was sure that they would facilitate the solution of the problem they had been appointed to consider if they unanimously accepted the resolution which was to be proposed, and which was to the following effect:—"That this conference do consider the practical and manual training of persons engaged or intending to be engaged in the building industries of London, and that it be an instruction to the chairman for the time being that matters not directly bearing upon this consideration be out of order, and that this resolution be not modified or rescinded except upon the unanimous vote of all the appointed delegates." This resolution would clearly mark out certain definite limits of possible inquiry, discussion, decision, and action, which would be of the greatest service to them in their deliberations, and he felt sure that it would be unanimously adopted. The agenda before them, even when they had adopted the resolution he had read. The first matter on the agenda was the advisableness of becoming a permanent committee, but they would probably find it desirable to postpone the consideration of that question until a later stage in the discussion. If they did this, after electing sundry officers, and not more than four co-opted members, they would proceed to the inevitable question of funds, and this would prove a somewhat difficult matter, because, although they might possibly obtain a room for their meetings, and rely on gratuitous secretarial help for a time, they could not hope to preserve a record of their proceedings, nor to carry on much correspondence or inquiry without some definite source of income to cover those expenses. If this difficulty could be surmounted, they would arrange their future meetings and discuss the admission of the Press, and then proceed to consider their relationship with the Technical Education Board. This was a question of some difficulty, because it was of great importance that they should in no way hamper the very excellent work that that Board was doing for technical instruction in London. It seemed their relationship with that Board should be that of cordial assistance, and that they should occupy a position of an advisory and consultative nature rather than one involving actual administration. This question having been settled, they would pass to Item No. 11 on the agenda, which was the crucial point of the whole matter. Under the two headings, apprenticeship and technical instruction, many interesting facts would probably be laid before the conference by the delegates. It was improbable, however, they would arrive at any other opinion than that neither apprenticeship nor technical instruction in their present forms were adequate for existing needs. It would be for them to find out

to what extent they failed, whether the restoration of apprenticeship was in any way possible, and whether technical instruction could be so developed as to take its place; whether the existing means of technical instruction were sufficiently practical, and whether the general regulation restricting classes to men actually engaged in the various trades was a right and proper one. That was an inquiry which would need all their patience and knowledge, but it was one which he submitted they ought to undertake. If they could succeed in indicating the direction of the solution of the problem, they would have taken a great step towards the establishment of a high standard of workmanship in the buildings of London. The remaining questions for them to discuss were, he thought, sufficiently explained in the agenda. The possibility of urging upon the London School Board the desirability of developing the work they are at present doing in the direction of manual instruction, the admirable work of the City Companies and the possibility of its extension, the question of enlisting the active efforts of the trade unions on behalf of workmanship, the influence of the South Kensington building-construction classes, the question of registration, and the possibility of organising competitions and meetings for discussion among workmen, were all points of the highest importance to workmanship, and deserved their closest attention.

Mr. Goldsmith then proposed the resolution, read by Mr. Fleming, who seconded it, and it was then agreed to *honi, con.*

The Chairman added that paragraphs 14 and 17 on the agenda would, by this resolution, be considered outside the scope of the conference, and would, therefore, be eliminated. These were with regard to the influence of trades unions upon workmanship, and the question of the overlapping of trades and consequent disputes and strikes.

On the motion of Mr. Burrows, Mr. Goldsmith was appointed hon. sec. of the conference.

It was next agreed that the item No. 2 on the agenda, for considering the advisability of a permanent committee, should be postponed.

The following four co-opted members were then asked to, viz., Sir Philip Magnus, Alderman Taylor, of the London County Council; Mr. W. R. Lethaby, architect, and Mr. Thomas Holloway, of the Works Committee of the London County Council.

It was suggested that the following trades should also be represented at the conference, viz., hot-water fitters, mill-sawyers and wood-cutting machinists, general smiths, fitters and bellhangers, coopermiths, and the electrical trades.

Principal Wells, Battersea Polytechnic, wished to say a word from the point of view of the Polytechnics, which had in their classes something like 60 per cent. of the students attending the classes in the whole of the Metropolis. At a conference of the heads of the different Polytechnics which met some weeks ago, they considered what action they should take, as a collective body, on the question of the formation of a permanent committee. The only conclusion came to was that some of them should attend the evening and hear what was to be said. But their difficulty was somewhat of this character: they felt that any movement of this nature must have represented upon it the Polytechnic element, and the conference knew enough of their relations to the Technical Education Board to understand that in any step they took they must carefully consider what the Board had done, and were doing, in the same direction, and whether, as busy people, they could usefully ally themselves with so many associations or conferences of this kind. The Technical Education Board had quite recently called representative meetings to discuss the question, and had behind them an unlimited capacity for getting at representative people, so that they must feel some doubt as to whether the Architectural Association was best fitted to open such a big subject. At the same time, they felt that their life-work at present was to advance the cause of technical education in London, and if any conference asked for their help, it was their duty to give it. They were, however, somewhat puzzled to say "Yes" or "No" to the question.

Mr. Fleming said that a feeling had existed for some time amongst architects that the average workmanship of the present day was not what it should be. That feeling was brought to a head at the meeting of the Architectural Association on December 8, 1893, when it was felt that architects, as the leaders and directors of workmanship, ought to take up the matter, and see whether, by any action of theirs, it could not be improved. Mr. Fleming then quoted the opinions of several

journals and representative men in favour of taking action in the matter, and concluded by proposing—"That it is advisable for this conference to become a permanent committee."

Mr. C. T. Millis, as representing the Borough Polytechnic Institute, felt they were dealing with the wrong point. He believed, indeed, they would be in a better position to discuss the question of the permanent committee at the end of the conference. He felt there was a need for something to be done for the education of the workmen, and many of them had been trying for a good many years to do something for the members of the building trade. They had gone through many troubles, and had encountered many obstacles, but at present they felt that they owed a deep debt of gratitude to the Technical Education Board, and also to the members of the central governing bodies of the London Polytechnics, for the opportunities put in the way of workmen for obtaining this technical education. During the last four years a great stride had been made in getting at workmen engaged in the building trades, and for that and other reasons it would not be advisable to vote at present on the question of the permanent committee.

Mr. Eva agreed with the last speaker as to the advisability of postponing the question.

Dr. Garrett remarked that something had been said as to the Technical Education Board hampering the action of other bodies, but he would be extremely sorry if it were supposed that the Board interfered with the efforts of educational societies or institutes. If, however, he were asked about the views of the Board with respect to this particular question, he would be inclined to say that when the question of appointing a representative to this conference was considered a few weeks ago, the Board in giving permission for a representative to attend, expressed opinions somewhat to the following effect: the Board would certainly welcome all suggestions, co-operation, and advice from a committee of this kind. They would also be glad to take part in any conference which was of a temporary character; but they were not, without further information, prepared to commit themselves to the appointment of a permanent committee, feeling, as they did, that if such a committee were made permanent it would have to exercise permanent functions which would be to a certain extent those of superintendence and control. The Board felt that there existed almost too many such controlling and inspecting bodies, and in order to simplify that action or control, so far as the Polytechnics were concerned, they had joined in the establishment of the Central Polytechnic Council. The establishment of a permanent committee, which would be independent of any of the existing authorities, would be a step in the reverse direction to that which the Board had taken in connexion with the Polytechnics. The Board, therefore, would not be prepared to commit themselves, without further knowledge, to take part in the establishment of any such committee. At the same time, the Board hoped such an opinion would not in the least degree prevent the conference continuing its deliberations.

Mr. S. G. Bird confessed that he had not quite seen the necessity for this committee. Speaking as a member of one of the City companies, who had done much for technical education, he believed they knew as much about the subject as most people. The programme now laid before them was a very ambitious one, embracing a large area, and dealing with many subjects, and he was afraid, when he entered the room, they would soon come to a dead-lock. He thought it would be well to adjourn the meeting. He could hardly see what the usefulness of this permanent committee would be.

After some further discussion, the following motion was unanimously agreed to:—"That this meeting be adjourned, and at its next meeting it discuss what steps can be taken for further technical education."

On the motion of General Moberley, seconded by Mr. Cutler, a vote of thanks was passed to Mr. Mountford for his conduct in the chair.

The proceedings then terminated.

ENGINEERING SOCIETIES.

THE INSTITUTION OF JUNIOR ENGINEERS.—On the 17th inst., a meeting of this institution was held at the Westminster Palace Hotel, Victoria-street, S.W., Mr. H. J. Young in the chair, when a paper on "Marine Engine Design of To-Day," was read by Mr. Henry M. Rounthwaite, M.I.Mech.E. In the discussion which followed, Messrs. W. Clifford Smith, H. Fraser, B. H. Joy,

W. H. De Ritter, W. Hunter, and S. Boulding took part.

LIVERTHOL ENGINEERING SOCIETY.—At the fortnightly meeting of this society, held on the 9th inst., at the Royal Institution, the President, Professor H. S. Hele Shaw, M.Inst.C.E., in the chair, a paper was read by Mr. John A. Brodie entitled "Tramways and Tramway Traction." The author, after a general *résumé* on tramways dealt in detail with the question of permanent way, and then proceeded to discuss the relative merits of horse, locomotive, cable, and electrical traction, and the comparative costs of the systems. A discussion upon the paper terminated the proceedings.

ARCHITECTURAL SOCIETIES.

CARLISLE ARCHITECTURAL, ENGINEERING, AND SURVEYING ASSOCIATION.—The ordinary fortnightly meeting of this Association was held on the 9th inst., in the committee-room of the Town Hall, when Mr. H. Higginson read a paper on "The Proposed Building By-laws of the City of Carlisle." He explained that upon consideration and with the approval of many members he had changed the proposed subject of his paper from "Building Construction" to the above on account of the peculiar pertinence of a paper on the proposed by-laws at the present time, and then went through them clause by clause, stating his opinions as to the advisability or otherwise of them. The chief points to which he took exception were the clauses requiring persons to submit elevations and plans and sections for the approval of the Urban Sanitary Authority, showing (hereon the construction of the floors and roofs, with the sizes and particulars of the timber girders, columns and stanchions which they intended to use marked thereon; and the prohibition of the use of fan-lights and skylights in water-closets, instead of windows. On the whole, the lecturer expressed himself pleased with the by-laws, and congratulated the City Surveyor (Mr. W. Howard-Smith, A.M.Inst.C.E.) on the successful framing of them. In the discussion which followed, attention was drawn to the stringency of the fire protection clauses, and it was pointed out that these extreme precautions were scarcely necessary in Carlisle.

LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.—At a meeting of the members of the Leeds and Yorkshire Architectural Society, held on the 14th inst., at the Mechanics' Institute, Leeds, a paper was read by Mr. J. W. Longfield on "Wrought Ironwork." The recent movement, he said, in favour of the increased use of wrought ironwork for electrical and domestic purposes in preference to the hard geometric productions of the foundry caused one to wonder whether the old and beautiful art of working iron would again become fashionable. As far back as the beginning of last century castings were intermixed with wrought iron, and gradually superseded it. There were, too, several other reasons why wrought iron fell into disuse. One was the passing of an Act of Parliament prohibiting the ornamental signs which had made the streets of London so picturesque. The lecturer concluded by urging the superiority of wrought iron-work over cast iron for both ornamental and practical purposes.

EDINBURGH ARCHITECTURAL ASSOCIATION.—A paper by the Rev. Robert Scott Mylne, London, author of "The Master Masons to the Crown of Scotland," was read at a meeting, on the 9th inst., of the Edinburgh Architectural Association, on "The Architecture of Bologna and North-Eastern Italy." After glancing briefly at the history of the province of Bologna, Mr. Mylne said every traveller had heard of the leaning towers of the city of that name, and everyone went to see them. Nobody knew exactly why they were built, or what precise purpose they were intended to serve, and although extremely curious, neither possessed architectural merit like the famous marble leaning tower of Pisa. The numerous arcades formed the most interesting architectural feature of the quaint medieval town of Bologna. Marble being scarce in the district, terra-cotta was frequently used for decorative purposes with much taste and skill. The capacious font of the Church of St. Marie dei Servi was one of the most remarkable examples of this kind. The long views of slender marble columns formed an elegant kind of arcade, and in front of the western façade formed a charming little quadrangle. The actual beauty of effect, however, was somewhat marred by the unfinished state of the main portion of the sacred edifice. In the Church of St. Bartholomew there was also a very well designed portico carved in stone by Lombard sculptors in the sixteenth century, from

beautiful designs of Andrea de Formigine, dated A.D. 1530. In the same way many of the old residences of the old nobility presented magnificent specimens of Lombard and Renaissance architecture. The street fronts were often very noble, while the gateways, courtyards, staircases, and colonnades provided capital examples of detailed design. The beautiful private residence of highest merit in the whole city was the Palazzo Bevilacqua. Though there were other palaces in Bologna of larger dimensions than the Palazzo Bevilacqua, and often possessing some particularly fine details, none as a whole excelled in merit. The particular residence, which was a typical example of Bologna skill. Was not the due sense of proportion, there so well exhibited, just the thing so often lacking in many fine modern buildings. Some of the fine houses in Bologna were chiefly noticeable for the interesting capitals the columns on their open arcades towards the streets. The paper, which was read by Mr. Thomas Ross, was illustrated by a series of photographs. At the close the thanks of the Association were awarded to Mr. Mylne.

Correspondence.

To the Editor of THE BUILDER.

NEW DISTRICT COUNCIL AND THE PUBLIC HEALTH ACT.

SIR,—The difficulty respecting the meaning of words "new building" has been overcome in the city of Sheffield by the insertion of the following clause in the Sheffield Corporation Act 1890—viz.: "The making of any addition to existing building by raising any part thereof or adding any projection therefrom, but so far as regards such addition only" "shall for all the purposes of this Act or of the Sheffield Corporation Act of 1883 and of the Public Health Acts of any by-law made thereunder respectively be deemed to be the erection of a new building." It is curious to note that the Sheffield Corporation Act was enacted on August 14, 1890, and that the Public Health Acts Amendment Act, passed on the 18th of the same month and year, does not contain any interpretation of "new building." EDWARD M. GIBBS.

THE "SECRET CHAPELS" OF THE SORBOINNE.

SIR,—Since the publication of my Notes on the subject of the sketch plan of the Dome (referred to in your issue of January 5), it is a matter of satisfaction to be able to chronicle the opening of a blocked entrance to the north-west Secret Chapel, the clearing away of the lumber from the passage from the transept—a clearance which has disengaged the chapel. There is no trace of the neat recessed referred to by Thierry, nor of the altar; the floor of the chapel is dust, its stones having recently been taken away when the chapel was dismantled. There is a small square shallow hole in the west wall showing where the support of the arch was, and near the passage, on the east wall, a plain piscina of 18 in. wide, by 18 in. high and 4 in. deep.

The outline of the blocked-up window is plainly visible, and there is an arch, similarly treated, in the wall of the chapel, in the corner, which coincides with the centre of the altar in St. Joseph's Chapel. This strikes one as indicative of a former entrance into the Dome Chapel from that side, where the present altar to St. Joseph was erected.

There is no staircase now in the narrow round passage as depicted by Blondel, whose plan accompanied my previous notes on the subject, nor does it seem possible, on examination, for one to have reached, but the staircase to the transept clock is in its corresponding pier on the other side of the transept. Blondel's plan, however, is slightly inaccurate as to the shape of the passage to the

have been given the assurance that the chapel floor will be reopened when the new quadrangle is advanced.

I might here correct an error I made in my notes. Richelieu's skull was replaced, in a hogan box, in a cavity under the monument in the transept, and not in the place where he was buried, as the coffin was let down, unawares to the body, into the disused sewer of Calvi, and at the Revolution his remains, minus the skull, were sent into the sewer.

I may remark, in conclusion, that no pictures have been found in the Chapel at its recent discovery, and that the picture of St. Paul recovering sight, by Brenet (see Thierry, *loc. cit.*), was copied from the 3rd Frimaire, An. II., to the 1st Civil, "jusqu'à nouvel ordre," according to

the Procès-verbal drawn up when certain coffins were moved from near the secret chapels.

JOHN A. RANDOLPH.

VESTRIES AND DRAINAGE.

SIR,—In view of the recent arbitrary action of vestries in respect of the drainage of private houses, whilst I think your correspondent on this subject in your last issue has but little ground for complaint, as it appears from his own account that his soil-pipe was not in any way ventilated, it may be helpful and instructive to note a recent decision on an application of the Paddington Vestry to have all the drain-pipes taken up because they would not stand the water test. The defendant had the drain tested by the most pungent scent tests, and without the slightest escape of the smell at any point. The drains were some feet deep, and it was represented that no drain in London would stand water pressure unless quite recently laid according to modern practice, and that it could not be established that any danger to health was to be reasonably feared. The magistrate took this view of the case, and decided against the vestry with costs.

"F.R.I.B.A."

** The decision was perhaps a reasonable one under the circumstances; but there are two sides to the matter. The water test is the most crucial, and therefore the most satisfactory, and the sooner all drains are laid so as to meet it the better.—ED.

ALTAR-TABLE AT TAWSTOCK.

SIR,—Would you be good enough to correct a misprint in my letter referring to Tawstock Church. "Modern altar-table" should be "wooden altar-table."

I wrote in haste, and probably my writing was not very distinct. CHAS. R. BAKER KING.

EXTERIOR PAINTING, ETC., TO LAW COURTS.

SIR,—Passing by the Law Courts a few days ago my attention was called to the very shabby state of the exterior of most of the doors, sashes, and frames, &c. Have they (the doors, &c.) been painted or varnished since the buildings were erected? If so, I should think the time has arrived for renewing the same. I did not stay to make an examination of the work, but I presume the oak doors were originally varnished, and the sashes and frames painted and varnished.

I do not know how they keep up the renovations to the Law Courts in Paris, but I should think, better than we do. "AN OBSERVER."

THE NEW UNIONISM.

SIR,—In the *Builder* of January 5 is published a notice emanating from the master builders of London, stating "that no workman shall in future be placed under any disability by reason of either belonging or not belonging to a union." I am pleased that the master builders have at last taken action against the tyranny of trades unions. At the present time a workman goes to work at a shop or job in the building trade; he is asked for the Federation ticket; if he has not got one he is told he will have to get one, and that if he does not consent to do this, in a few hours every man will strike against him, and the result is he is discharged. The labourers will refuse to wait upon a non-federated workman, and it has often occurred that a labourer has refused to fetch a carpenter a handful of nails unless he showed a federation ticket—in fact, it is almost impossible to get a job without it. It is in this way men are forced into the unions.

It is high time the federation ticket is abolished, and I hope the masters will persevere and stop this un-English practice, for I am sure with a little encouragement and a firm promise of protection, with good faith, at least 50 per cent. of the members will be only too glad to escape from the clutches of their unions.

"A MEMBER OF A NON-FEDERATED UNION."

TRADE CATALOGUES.

THE "Crypto Works Co." send us their illustrated catalogue of electrical plant, which includes motors specially laid out for driving ventilating fans; an application of electrical power which is likely to receive increased attention now that the desirability of mechanical ventilation under many circumstances has been so largely recognised.—Messrs. Easton & Anderson send us their illustrated catalogue of lifts of all kinds—electric, hydraulic, and hand-power, for houses, offices, and warehouses; loading-out lifts, hydraulic cranes; and plant for the supply of water to country houses. These last include hydraulic rams, water-wheels, turbines, electric motors, engines, and windmills. The remarks and suggestions in this portion of the catalogue will be found useful.—From Messrs. Hamilton & Sons we have an illustrated catalogue of painting brushes of every kind, both for general painting and decorative work; as also painters' tools and materials.

The Student's Column.

BRICKS AND TERRA-COTTA.—III.

DISTRIBUTION OF BRICK-EARTHS.

THE distribution of the various earths employed in brick-making may be considered from two points of view, according as they are interstratified between solid rocks, or exist as mere superficial accumulations. The former may be conveniently subdivided and referred to specifically under the divers geological formations in which they occur. Commencing with the most ancient of these, as developed in England and Wales, we may say that practically no clays are found in the *Cambrian* and *Ordovician* rocks, for the simple reason that almost all the argillaceous deposits in them have been turned into slate. As the waste produced in quarrying this latter material, however, is now frequently made into bricks, we may just give an outline sketch of the districts where it is raised, including the slates which are classed in the *Silurian*.

Cambrian slates occur in all the main subdivisions of the formation, those in the Tremadoc being 1,000 ft. in thickness, and traceable from near that place to Dolgelly, in North Wales. Amongst *Ordovician* rocks we have the dark slates and shales of the Arenig Mountain, Arran Mowddu, Ffestiniog, and Cader Idris. The Arenig rocks of North Wales consist of iron-stained, black, and fine-grained dark grey slates, well developed near Portmadoc, and at places east of Ffestiniog. In South Wales, at St. David's they are principally black slates; whilst in the Lake District similar rocks occur in the Skiddaw area, at Longside, Keswick, Scafell, and White-side. The precise geological age of the Leicestershire slates is unknown, but they are doubtless correctly placed about the horizon now under description; they are found at Swithland, Groby, &c. Thick masses of slate are characteristic of the Bala group.

Passing now to the *Silurian*, the fine, smooth, light-grey or blue slates, which have been traced from the mouth of the river Conway into Carmarthenshire, are well-known, in the division known as the Tarranonn shale. Then there are the grey and black shales of the Wenlock series, which outcrop on the banks of the Severn near Coalbrookdale, and stretch across Radnorshire, almost to Carmarthen; in the Malvern Hills they are estimated to be 640 ft. in thickness, and more than double that to the north. Speaking generally, the Wenlock beds of North Wales and Westmoreland are chiefly shaly and indurated, in places even passing into slate; whilst in South Wales they are softer, and consist of true shales and sandstones. The shale of the Ludlow division of the *Silurian* is a prominent feature in the escarpments which range through Shropshire and in parts of Montgomeryshire, in the neighbourhood of Welshpool, and is 750 ft. thick in places. The sub-division called the Ledbury shales include grey, red, and purple marls, shales, &c., west of the Malvern chain.

With these the Lower Palaeozoic rocks are brought to an end. There can be no doubt that the shales in the upper divisions alluded to—those of Tarranonn, Wenlock, Ludlow, and Ledbury—are suitable for brickmaking. To a certain extent they are utilised for that purpose, but to nothing like what they might be. It may be objected that, as a rule, they are too hard to become readily plastic, which is decidedly the case over parts of the areas alluded to, though even there the application of a little machinery would soon overcome the difficulty. In the more or less mountainous tracts in which these *Silurian* shales are found there is frequently an abundant water-supply, which, with but little engineering skill, could be converted into power for driving the machinery connected with any brickworks that may be established. We shall have to allude to the composition of shales later on, but it may be noted that several of the shales now under discussion are suitable for the manufacture of high-class fire-bricks.

The argillaceous deposits of the *Devonian* rocks are few and far between. In North Devon, however, the formation is largely composed of shales and shales of purple, grey, and olive-green tints, in the vicinity of Ilfracombe, Barnstaple, and Lynton, and these are of enormous thickness. Very little attempt has hitherto been made to work them for brick-making purposes, though both in Devon and Cornwall the best-cleaved portions yield excellent slates at Delabole, near Camelford, at Tavistock, and elsewhere.

Carboniferous rocks are largely drawn upon for

various materials used in the manufacture of bricks, and are especially noteworthy as yielding fire-clays. These, accompanying coal-seams, are frequently obtained from mines, and occur in almost every district where coal-mines are situated. The principal counties wherein fire-clays are actually worked, arranged in order of magnitude of output, commencing with the most important, are as follow:—Durham, Stafford, York, Glamorgan, Northumberland, Lancashire, Denbigh, Flint, Worcestershire, and Monmouthshire. Fire-clay usually lies beneath the coal-seams in layers, varying in thickness from a few inches up to several feet. It is found in most abundance, and generally of best quality, beneath the coal used for coking and manufacturing purposes. The same useful material is largely exploited in mines in Scotland also, especially in Lanarkshire, Ayrshire, Edinburghshire, Fifeshire, Stirlingshire, and Renfrewshire. In Ireland the only fire-clay obtained from the *Carboniferous*, also worked in mines, is from County Tyrone. In addition to clay suitable for refractory goods, the *Carboniferous* formation yields several excellent earths adapted for the manufacture of ordinary bricks, more particularly in Denbighshire and Lancashire. Nevertheless, extensive tracts exist in which clays of this age are well developed and suitable for better-class burnt goods, but which are hardly touched. The most important of these are the Lower Limestone shales and clays of the west of England and thin clays in the upper *Carboniferous*. Excellent bricks are made from a material known as gannister, found in association with coal-seams in Durham, Yorkshire, &c.

The marls of the *Permian* formation have been largely utilised for brickmaking in certain areas in the Midlands. The marls of the *Triassic* also furnish abundant material for making bricks and pottery wherever they crop out in the Midlands and elsewhere. The latter frequently contain thin beds of light greenish marl with a considerable proportion of carbonate of lime—not a very desirable constituent in many instances, at least in large quantities. The same formation occasionally yields clays suitable for the manufacture of terra-cotta. The vast majority of clays and marls of *Triassic* age are red, with a tendency to mottling in some localities.

We come now to the great mass of clay and marl forming the bulk of our *Liassic* rocks. From these a very large proportion of English bricks are made, and the material is suitable for their manufacture at almost any point along their outcrop from Lyme Regis in Dorset, through Somerset and Gloucestershire up into Northamptonshire and Lincolnshire, and on through Yorkshire to Redcar. The material naturally varies a great deal from place to place, and the quality of the bricks produced is, consequently, an uncertain factor, except in localities where the manufacturers understand these little peculiarities, and are prepared to cope with them as they arise, by judicious admixtures of other earths, or as the case may be. Mr. Horace B. Woodward remarks * that some of the clays are too calcareous, more especially those which alternate with the limestones in the basement portions of the lower *Lias*. In other cases, shells and small calcareous nodules render the clays unsuitable. The *Lias* clays frequently contain iron pyrites a very objectionable feature—which have to be removed in the preparation of the raw earth for the manufacture of good bricks. Some of the best bricks from this formation are said to be made at Hill Moreton, near Rugby. Most of the lower *Lias* clays are stiff and calcareous, or shaly; there are seldom any beds of loam interstratified with them, such as are best adapted for brick-making. Mr. Woodward states, however, that milder or loamy earths are to be found in the lower part of the middle *Lias*, and such beds are worked south of Allington, near Bridport, near Ilminster and Glastonbury, at Stroud, Banbury, and other places. The upper *Lias* is very extensively worked for making bricks, tiles, &c., from the neighbourhood of Banbury, northwards through Northamptonshire to Lincolnshire.

The estuarine clays of lower *Jurassic* age are well-developed in Northamptonshire and Lincolnshire, where they in places yield excellent materials for brickmaking, as at Stamford, Great Oakley, Water Newton, Wood Newton, between Stanion and Brigstock, and between Pilton and Luffenham. At Little Bytham, also, bricks of singular hardness and durability have been made for many years from the Upper Estuarine series; occasionally, as at Wakerley, fire-clay occurs;

which is also suitable for the manufacture of terra-cotta, though we do not know how far this material has been worked there in recent years, as there is no official record of the same in the "Mineral Statistics." The Bradford clay, so-called from the development of the formation in the neighbourhood of Bradford-on-Avon, in Wiltshire, also gives good brickmaking material.

Omitting a few minor clay beds we come to the great argillaceous mass called the Oxford clay, of middle *Jurassic* age, the maximum thickness of which is about 600 ft. It persists as an irregular belt several miles in width across its outcrop from the Dorset coast to that of north-east Yorkshire. It consists mainly of layers of stiff blue and brown clay from which millions of bricks are made annually, but the material usually requires very careful preparation to turn out really good work. With reference to this, Professor Judd remarks * that in the Northamptonshire and neighbouring areas the Oxfordian series is extensively dug for brick and tile making. The materials thus produced vary considerably in quality at different places, owing to the great range of differences in mineral character which the clays from the several horizons in this formation present when compared with one another. The most conspicuous of these differences consists in the proportion and quality of the sand occurring in admixture with the plastic mass. The Kellaways beds, a member of the same series, have produced many bricks at Oundle, Southwick, Benefield, Warrington, and other places, and Professor Judd says it is believed that the bricks made from them are of better quality than those manufactured from Oxford clay, especially in respect to the amount of heat which they will bear.

There is very little difference in lithological character between the Oxford and Kimeridge clays, though the latter comes from the upper *Jurassic*. It has a geographical extension from the Dorset coast to Yorkshire, running parallel to the outcrop of the Oxford clay, and is about 600 ft. in thickness. Brickyards occur all along the route, dotted at convenient intervals, mostly in the vicinity of the larger towns.

The *Woolwich* clay, so extensively developed in Kent and Sussex, which reaches a thickness of 1,000 ft., is largely employed in brickmaking in the counties mentioned. It consists of a vast series of fluviatile or estuarine deposits, mostly impure clays of dark colour. We shall have occasion to describe these more in detail when speaking of chief brickmaking centres.

The *Gault* clay, a dark, stiff, blue, argillaceous bed, sometimes sandy, or calcareous, with pyrites and phosphatic nodules and occasional beds of green sand, varies in thickness up to 250 ft. It extends as a sort of fringe round the denuded anticline of the Weald of Kent and Sussex, and, generally, conforms to the outcrop of the base of the chalk, following that formation into the Isle of Wight on the south and trending in a north-easterly direction up into Cambridgeshire. It is found also as isolated patches on older rocks here and there. *Gault* bricks are proverbial, but the name is often made to apply to others than those made of the *Cretaceous* clay now under discussion. In the vicinity of Cambridge are several brickyards, the sections in some of which are of considerable depth; the clay is not particularly arenaceous, but sufficiently so for making the commoner kinds of brick, in manufacturing the better qualities, sand has nearly always to be added.

The mottled clays of the *Reading* series, lacustrine deposits, have been used for many years in brickmaking near Reading, and from that place at divers points up to Croydon; also on the western flanks of the London basin. The *Woolwich* and *Reading* beds also yield raw material suitable for making fire-bricks, as at Ewell, near Epsom. In the Hampshire basin, these mottled clays are much employed.

The *London Clay*, extending all over the London basin, is very largely drawn upon, as every one knows, for making bricks.

Of the remainder of the Tertiary beds we need only mention the *Bagshot* and *Headon* series, the former in the London and Hampshire basins, and the latter in the Hampshire alone, which have been utilised to a limited extent for brick-making. The pipeclays and potters' clay of the middle Tertiary of Dorset, used in the manufacture of terra-cotta, were alluded to in the last article.

The only geological deposits of any note not yet described are the various brick-earths found in broad river valleys, which belong to a very

recent period, and have, in fact, been laid down since man inhabited these islands. These are the superficial accumulations alluded to at the commencement of this article. They are so very generally spread, and vary so much in character, that it is impossible to sum up their chief features in a few words. They are extensively employed, and any special observations will be reserved until the materials used in the manufacture of various kinds of English bricks are described in detail.

GENERAL BUILDING NEWS.

NEW THEATRE, KILBURN.—A new theatre is to be built at Kilburn, at a cost of 17,000*l.*, which has been designed by Mr. Frederic W. Fryer, of Westminster, under whose direction the building will be carried out. It will seat 1,700 persons. The style adopted is French Renaissance. A public hall, to be called the "Queen's Hall," is to be erected on a site adjoining the above, from designs by the same architect, at a cost of 13,000*l.*

CIRCUS BUILDING, LEEDS.—This building was erected for the annual exhibition of the Leeds Smithfield Club Cattle Show, certain provisions being included in the design so as to convert it into a circus. It is 335 ft. long and 142 ft. wide, or an area of 5,300 square yards. The height of roof at sides is 14 ft. and at ridge 40 ft. This is supported on pillars from 7 in. to 11 in. square. The centre transept is 42 ft. wide, with two aisles on each side, all 25 ft. wide, making up the total of 142 ft. Eight of the above pillars had to be left out to form the chariot ring, which is 190 yards round it, and these spaces, each 10 ft. apart, are bridged over by the antilever principle by beams, struts, and struts, all 4 in. by 11 in. The trick ring is 44 yds. round it. The building proper contains nearly 300 tons of timber, and was erected in sixteen days, the roof principals for centre transept having been put together previously. The contractor was Mr. William Walker, of Leeds. Mr. William N. Wynn, C.E., of Leeds, was the architect.

THE BUILDING TRADE IN GLASGOW IN 1894.—The special feature of the building trade in Glasgow during last year was that it was exceedingly busy. The number of tenement buildings erected in Glasgow during 1894 has been very great, particularly in the suburbs. Red stone seems the favourite material now used for all classes of buildings.

SCHOOL EXTENSION, COVENTRY.—Additions are being made to Bablake School, Coventry. These consist of the provision of two separate buildings, one a lecture theatre, and the other a shop for wood working. The lecture theatre will be 25 ft. wide and 40 ft. long, and has a connected preparation room 10 ft. wide and 18 ft. long. The room is vainscotted by pitch-pine dado. It will be heated by hot-water coils, and the gas-fittings will be iron and ornamental, and the whole of the joinery work is of pitch-pine. The main entrance is by folding doors leading from the main corridor of the present school buildings. The two buildings are in the rear of the present schools. The architect for the work is Mr. H. W. Chattaway; the contractor, Mr. C. Haywood, jun.; and the clerk of the works, Mr. F. Morgan.

SCHOOL BUILDINGS, CARDIFF.—On the 9th inst. Mr. Lewis Williams, J.P., chairman of the Cardiff School Board, opened the elementary school premises recently erected in the vicinity of Roath Park. The accommodation in the school is as follows:—Girls, 380; boys, 380; infants, 478; total, 1,238. The buildings consist of the infants' school, a one-story building, and the boys' and girls' school, the girls' school being on the ground-floor and the boys' on the first floor. Besides the school buildings there are covered playing-sheds and sanitary offices, and a caretaker's house.

The buildings are constructed of rubble masonry, faced with brickwork, with terra-cotta and real Carlisle stone dressings. The floor of the boys' school is of concrete and iron, and the schools are planned on the class-room principle with wide corridors, and, as far as possible, communication has been provided between the rooms, independent of the corridors. The work has been carried out by the contractor, Mr. Harry Gibbon. The architect is Mr. E. W. M. Corbett, and the clerk of the works was, during the earlier part of the work, Mr. T. Wale, who died when the work was about half done. For the remainder of the time the work has been under the supervision of Mr. Gardner.

PUBLIC SCHOOL, WISHAW, LANARKSHIRE.—On the 15th inst. Wishaw new Public School, which has been erected by the Cambusnethan School Board at a cost of 11,000*l.*, was opened by Mr. James Houldsworth, of Colnless. The new school is designed in the Grecian style, and is built of red sandstone from Dumfriesshire. It stands facing Main-street. The main building is two stories in height, and measures 106 ft. in length by 86 ft. in breadth. Internally the centre is occupied by a rectangular hall rising through both stories, with galleries all round above. This hall will be used for marshalling and drilling the children. The accommodation for scholars comprises seventeen class-rooms, with places for 1,054 pupils. Special provision is made for secondary education. The

* Memoirs of the Geological Survey. "The Jurassic Rocks of Britain," vol. iii. (1893), p. 298.

* Memoirs of the Geological Survey: "Geology of Rutland," 1875, p. 239.

four teachers' rooms provided in the building. The arrangements for heating and ventilation have been carried out on the propulsion system, the motive power being supplied by a gas engine in basement. The building has been erected from plans prepared by Mr. Robert A. Bryden, architect, 1890w.

Sanitary and Engineering News.

SALFORD SANITATION: GOVERNMENT INSPECTION.—During the past three years the Local Government Board, through its medical inspector, Dr. Geo. Low, has instituted a series of inspections as to the sanitary conditions of our larger towns, with special reference to the prevention of cholera infection, and the isolation of such cases as may occur in spite of precautions. Recently the inspector examined the various sanitary works carried out by the Salford Corporation, and at a special meeting of the Health Committee convened for the purpose of receiving his report and recommendations, he expressed great satisfaction with the works already executed. He stated that the recently-erected model lodging-house was the best of its kind that he had seen. The artisans' dwellings, the hospitals for the treatment of infectious diseases, the very extensive works connected with the interception and treatment of sewage, and the destructors erected for the burning of refuse, showed that the Corporation were alive to the requirements of the health of the borough. It would, therefore, not be necessary for the Local Government Board to issue any instructions to the Corporation, other than such observations as an inspector might think fit to make at that meeting. He also reminded them that the advent of the Ship Canal now rendered Salford more liable than before to become infected with cholera, as a port having shipping relations with all parts of the world. He would urge upon the authority the advisability of extending the water-closet system, or here the pail system is in use, he would recommend that the amount of water contained in each closet should be a minimum. The sanitary authority should continue to relay such sewers as are found to be defective, and in no case should un-water pipes be allowed to act as ventilators to the sewers. With respect to the condition of the dwelling-houses, attention should be directed to the questions of ventilation and freedom from dampness.

FOREIGN AND COLONIAL.

FRANCE.—As might have been foreseen, the municipal council of Paris has definitely refused to accept the Metropolitan Railway scheme.—M. Peter, the sculptor, has executed a medallion portrait in silver of M. Pavis de Chavannes, which is to be presented in the occasion of a grand banquet to be given in honour of the distinguished artist having attained his seventieth birthday.—The Minister of Fine Arts has been paying a visit to the new Sorbonne buildings, during which he presented the architect, M. Nouet, with the Grand Cross of the Legion of Honour.—The *Journal Officiel* publishes in full the report of M. Guadet on the competition for the 1900 Exhibition.—M. Detaille has been appointed President of the Société des Artistes Français (the old Salon) in place of M. Bonnat, who has resigned, and been elected honorary President. M. Ernest Harris and M. Ch. Carlier have been elected Vice-Presidents.—The "Nord" Railway Company is about to carry out extensive works, at a cost of more than ten million francs, for the extension of the Paris terminal station, which is insufficient for the traffic.—The Association of "Architectes Diplômés par le Gouvernement" has awarded to M. Umbdenstock (pupil of M. Guadet) the medal which they offer to the student of the year who has received the largest number of awards at the *École des Beaux-Arts*.—The jury of the competition for the new *École Coloniale* at Paris has given its award. The execution of the building is to be entrusted to M. Maurice Yvon, Architect to the Colonial Department. The second premium has been awarded to M. Masson Detourbet, and the third to M. Rochet. The building will be erected in the Avenue de l'Observatoire, at the corner of Rue Auguste Comte. There were fifteen competitors.—The new station at St. Cloud, built to replace the old wooden structure, is now completed.—M. Jules Sufist, an official architect under the Paris Municipality, has died rather suddenly.—The death is also announced of M. Hippolyte Noel, painter, and a professor at the Museum of Natural History, at the age of sixty-six. He was a member of the "Société des Artistes Français," and an annual exhibitor at "Champs Elysées Salon." We have to record also the death, at Paris, of an esteemed painter of Still Life subjects, M. Guillaume Fouace, pupil of M. Yvon. He was also an exhibitor at the "Champs Elysées," and obtained an honourable mention in 1884, a third medal in 1891, and a first medal in 1893. He was also a talented sculptor, and was mentioned under this title at the Salon of 1890.

GERMANY.—The Emperor has expressed his approval of the statue of the Hohenzollern princes for the White Salon of the Imperial Palace at Berlin, and has conferred decorations on the following artists: Messrs. Ihne, Geyer, Lessing, Schaper,

Boese, Schott, Toberentz, Calandrelli, Eberlein, Unger, Hundreiser, and Baumbach. Professor Calandrelli was also presented with the Gold Medal for Art. By 1897 the statues are to be executed in marble.—Four marble statues, representing respectively Fishery, Navigation, Agriculture, and Commerce, have been set up in the vestibule of the Berlin Town Hall.—The Ginsberg prize for 1895, founded in memory of the artist of that name who perished in the earthquake at Ischia, has been awarded to the painter von Brandis, and the sculptor Karl Reinert.—The Baden Government has decided to remove the Observatory from Karlsruhe to Heidelberg, where it will be more in touch with the University. The observatory buildings are to be erected on the Gaisberg at a cost of about 11,500*l*.—The cathedral at Trèves is to be restored; the necessary funds will be provided by a lottery, which has been sanctioned by the Government.—Oldenburg is to be placed in direct water communication, *via* the new Dortmund-Ems Canal, with the Westphalian coalfields. To effect this, improvements will be made on the canalised Hunte, and the Hunte and Ems canal.—A bronze bust of Herr von Stephan, by the sculptor Kust-von Brandis, has been set up at Emden, the hardt, of Hanover, the chief submarine telegraph office.—At the first winter meeting of the German Archaeological Institute at Athens, Dr. Dorpfeld lectured on the results of last year's excavations at Hissarlik, the site of ancient Troy, undertaken under his direction.—Dr. Julius Nane, of Munich, has now completed his investigations, commenced in 1881, in the tumuli between the Ammer and Staffel lakes in Bavaria. In all 356 graves were opened, and large numbers of finds obtained. Dr. Nane assigns the oldest graves to a period of 1400-1200 B.C.—The Emperor has approved of Hermann Prell's designs for the wall-paintings in the Great Hall of the Palazzo Caffarelli, the site of the German Embassy at Rome. The pictures, three in number, represent the wooing of Gerda, in the Northern Legend symbolical of the Earth, by Frey, the Sun-God. The same artist's wall-paintings for the stairway of the Silesian Art Museum at Breslau, which are also mythological in design, have recently been unveiled.—The Works Committee of the 1896 Exhibition has been authorised to conduct a lottery of 4,000,000 tickets of one mark each, for the benefit of the Exhibition funds. The prizes will be chosen from the exhibits. It has now been decided that amongst the "attractions" of the Exhibition there will be a Street in Cairo and an aquatic show.—The new St. Paul's Church, in the suburb of Schöneberg, has been consecrated in the presence of the Emperor and Empress. The edifice, which is carried out in red brick and lighted by electricity, provides seating accommodation for 1,550 worshippers. Baurath Schwechten is responsible for the plans.—The Stralau Treptow Tunnel Railway has been sanctioned by the Police authorities.

MISCELLANEOUS.

DIARIES FOR 1895.—We have received from the office of the *Estates Gazette* (6, St. Bride-street, E.C.), a diary and directory for the use of surveyors, auctioneers, and land and estate agents, for 1895, which is the thirteenth edition of the directory and the eighth edition of the diary and directory combined. The work, which is admirably got up, contains a list of the principal auctioneers, land and estate agents in London and the country, names and addresses of members of the Surveyors' Institution, the Auctioneers' Institute, and the Institute of Estate and House Agents; also a list of the important compensation claims which have been made of late years for property compulsorily acquired, and other information of value to surveyors and auctioneers and house-agents. The work is well bound and conveniently arranged.—The *Sanitary Record* has presented to its subscribers a diary for 1895, a copy of which has been sent to us. The chief aim of the editor has been, we are told, to make it a handy and compendious *note-book* for medical officers of health, sanitary inspectors, and all sanitary officials; a book in which they may not only record the appointments and doings of each day, and be reminded of duties which the recurrence of particular dates imposes upon them, but to which they can turn with confidence for facts, figures, statistics, suggestions, instructions, references, legal decisions, addresses, text-books, and the manifold other hints and helps for which they would otherwise have to have recourse to a whole library of books. The diary contains a useful article on sanitary legislation in 1894, and other information of interest to sanitary officers. The price of the work to non-subscribers is 2*s*. 6*d*.—We have received from Messrs. Chas. Straker & Sons (Bishopsgate-avenue, E.C.) a copy of their "Engineering and Machinery Diary, 1895." The work, which has been compiled by Mr. J. Stephen Jeans, contains formulae, tables, &c., for the use of users of machinery. It appears to be a useful business diary.

CENOTAPH, CAMBORNE.—A cenotaph of yellow magnesia limestone, with a plain border of polished red Dartmoor granite, has just been placed on a wall over and above the grave of an infant daughter of Mr. John H. Holman, at Camborne. The memorial is square, and has within it a large circular

panel deeply sunk, and containing a modelled and carved figure of a kneeling angel holding an ornamental shield, upon which an inscription occurs. The work has been carried out by Messrs. Harry Hems & Sons, Exeter.

NEW PLUG-CHAIN FOR LAVATORY BASIN.—Messrs. Winn & Co. (Birmingham) have produced a small patent which may be useful. The object is to avoid the inconvenience of the chain to the plug of a fixed lavatory basin. The chain passes through a hole at the back of the basin (just above the rim), and is weighted so as to be drawn back as soon as the plug is removed from the plug-hole; the chain disappears, and draws the plug up after it to the rim of the basin. The only fault to be found with this is that a plug that has worn loose, or is not very tightly fitted into the plug-hole, may be drawn out when it is not intended.

WELLS' "INDUSTRIAL" OIL LAMP.—This lamp, of which an illustration and description have been sent to us by Messrs. A. C. Wells & Co., of Medland-road, is a "regenerator" lamp stated to give a brilliant and steady light from ordinary petroleum or kerosene. A special point claimed for it is that there are "no glass chimneys to break," three mica windows or panes replacing the usual glass cylinder.

THE SLATE TRADE.—The upward tendency of prices still continues, the recent advance (as we mentioned in November last) being a moderate and reasonable one, fully warranted by the state of trade, but at the same time not sufficient to provoke competition. In most parts of Lancashire, and in the Glasgow district, trade has been especially brisk, and fair in all parts of the kingdom. The German trade also has kept up, the only serious falling off being in the Australian market, caused by financial troubles in those colonies. The labour market has also been in a satisfactory state, the men earning good wages, and there have been no strikes. The opening of the Manchester Ship Canal has had a beneficial effect, though not perhaps in the manner contemplated by the Canal Company, as it has caused a considerable reduction in railway rates to Manchester and the adjoining districts. The system of buying from "hand to mouth," to which we have before called attention, acts most prejudicially to all concerned, and it would be well if builders and contractors would give longer notice of their requirements to their merchants, as during the past year several buildings have been kept waiting for weeks for the particular kind of slates required—a difficulty easily explained when the number of different sizes, qualities, and colours of slates are considered.

FLUSHING SEWERS.—From Mr Jas. Lovegrove's annual report to the Board of Works for the Hackney district it appears that in this district the tank system of flushing sewers has now been in operation ten months and has worked well. The water is now discharged from the tank exerts a much more powerful effect in scouring the sewers than the system hitherto adopted. The tank, which contains 1,800 gallons, is placed near the flushing shaft, then charged from the hydrants, and when full discharged through a spin tube. It takes about twenty minutes to fill, and discharges in three minutes.

THE "KALLIO" IMPROVED GULLY.—This is a gully more especially for scullery and kitchen waste, its special feature being a contrivance to reduce the exposed surface of water on which fat may be floating, and thus to do away with one source of nuisance. The waste water enters the gully through an inverted conoid, leaving a circular opening in the centre, and the majority of the standing water surface in the gully is around the opening orifice, and closed in by the top of the conoid, only the surface under the central circular orifice being exposed. There is a handle for lifting the conoid cover for cleaning it. The gully is made by the House Sanitation Company.

SANITARY INSPECTORS' ASSOCIATION.—In connection with the course of lectures and demonstrations for sanitary officers arranged by the Sanitary Inspectors' Association, Mr. S. G. Fairchild, R.P.C., delivered the first of two lectures on "Details of Plumbers' Work," at St. James's Hall, Piccadilly, W., on Saturday evening last. Mr. Thomas presided. The lecturer first dealt in some detail with the metals used by the members of the plumbing craft, exhibiting tables showing the relative tenacity, malleability, ductility, fusibility, and specific gravity of these metals. He spoke of zinc as being the most unsuitable metal in common use for the purpose of sanitary work. Dealing with soil-pipes, he said lead was without doubt by far the best material for such pipes. In the hands of a skilled plumber it could readily be manipulated to fit any desired position, with the advantage of the preparatory work being executed on the job. It was smoother than iron, and when properly constructed of drawn pipe, and ventilated, it was not affected by the various gases and acids passing through it. Moreover, lead was far more durable than any other metal in common use, and less liable to incrustation, and when jointed by means of wiped soldered joints, the soil-pipe branches, lead-traps, and anti-siphoning pipes practically became one homogeneous mass, perfectly gas- and watertight from end to end. Another great advantage lead pipes possessed was that they could be easily fixed in any position without difficulty, either outside or inside a building, and in the most artistic manner, to corre-

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TIMBER.	TIMBER (continued).
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TIMBER.		TIMBER (continued).
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Greenheart.	D.G.			Satin, Porto Rico	c/o/6	c/z/1
ton	8.3	000		Walnut, Italian...	0/0/31	c/z/1

Peak, E.I., load	1000	1600
sequola, U.S. ft. cu	110	22

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Birch, do.	200	400	
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land	217
Bar, Welsh, in	

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Canada	5/5	6 15 0	Do. do. at works		

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Do. Yellow	9/10/0	5 15 0	Do. Staffordshire,	

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St. Petersburg..	5/0/0	6/10/0	C. I. F. E. — British		

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays.*]

ACCRINGTON.—Accepted at a schedule of prices for excavating, sewerage, levelling, paving, &c., for the Corporation of Mr. Wm. J. Newton, C.E., Borough Engineer, Town Hall, Accrington:—
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George Hulme & Son, Water-street, Accrington—one street.

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CARDIFF.—For the erection of a residence, Cefn-Coed, Roat Park, for Mr. J. W. Hibbert. Mr. Edwin Seward, architect, Queen Chambers, Cardiff.

Jones & Thornley	£3,911	4	7	Chas. C. Dunn	£2,818	0	0
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Jas. Allan	3,114	4	0	Cardiff (accepted)	2,687	0	0
David Davis	3,052	0	0	Lissaman	2,680	0	0
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Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED. All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

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VOL. LXXIII. No. 2712.

JAN. 25 1895.

ILLUSTRATIONS.

Flamboyant Gate, Albi Cathedral, France.—Drawn by Mr. C. E. Mallows	Double-Page Photo-Litho.
Competition Design for St. Pancras Municipal Buildings.—By Messrs. F. H. Tulloch and Langton Dennis, Assoc. R.I.B.A.	Double-Page Ink-Photo.
Palazzo Notari, Ventimiglia, Italy.—Mr. W. D. Carbe, F.R.I.B.A., Architect	Double-Page Ink-Photo.
Small House at Brentwood: Front and Side Elevations.—Mr. E. A. Hill, A.R.I.B.A., Architect	
Itton Court, and a Lych Gate, Monmouthshire.—Mr. E. Guy Dawber, A.R.I.B.A., Architect	Two Single-Page Photo-Litho's.

Blocks in Text.

Sketches in article, "The Church of St. Mary, Harrow-on-the-Hill".....Pages 53, 59	Plan of Block of Buildings, Wimbeldon.....Page 6
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The Church of St. Mary, Harrow-on-the-Hill.



CONSPICUOUSLY set on its hill, hardly ten miles from London, Harrow Church should attract our readers to pay it a visit. Some fresh interest has lately attached to its architecture. Inquiry into its history has been stimulated* by a commemoration last year of the 800th anniversary of a consecration which links the structure with the honoured names of Lanfranc and Anselm. For Harrow Manor was early in Saxon times granted to the see of Canterbury, and Eadmer, in his life of S. Anselm, relates how the archbishop came and consecrated, after a dispute with the Bishop of London, the church there, "which had been Lanfranc's building." This was his first consecration in England, and the date can be definitely fixed as January, 1094. To mark the occasion of this interesting commemoration a sum of money has been subscribed, and proposals for its expenditure have led to a better knowledge of the history of the fabric. In 1893 some of the plaster covering of the tower was removed, and the dates of its erection are now be clearly conjectured. Fortunately, the complete stripping, at one time proposed, was stayed; so there still exists for us one of the very few examples, which modern methods have spared, of that traditional covering of rubblework which was usual in Mediaeval times. This last three months, in an attempt to add an organ chamber to the south of the chancel, remains have been uncovered in its south wall of thirteenth-century windows, and this discovery finally cuts the ground away from the theories which have so long, and in spite of much evidence to the contrary, attributed Harrow Church—or, at any rate, some large portion of it—to the fourteenth century.

It is now to be seen how the history of its architecture has been misrepresented, as much by the caricature of restoration as by the result added to injury—constant mis-

description of its features. Misreport has acted on misrestoration, and *vice versa*, till both the genuine forms and their traditions have fatally suffered. Lysons, in his "History of the Environs of London," was the innocent originator of some of this wrong. His words may be quoted: "Some parts of Lanfranc's building still remain, viz., the circular columns which divide the aisles from the nave, and part of the tower at the west end, where is a Saxon arch of singular form. . . . The church appears to have been rebuilt in or near the fourteenth century, being the kind of architecture then in use." This opinion of the architecture is loose enough, and the latter part of his statement, as to the fourteenth century, rests as clearly upon no evidence. But as to the first part he has consulted Eadmer, and since "Saxon" was the term in use in his time to denote the native Romanesque, which we call "Norman," his account is not incorrect. The outside of the tower window can now be seen, and may well be of Lanfranc's building—though the arch of the west doorway is certainly some fifty years later. But it has the look of an insertion, and the tower may have been built without it and have opened only into the church.* For being western, not central, as the Norman Lanfranc's tower should have been, its position is as at Iwer, ten miles off (where parts of the eleventh century still remain), like those of other early churches within reach of a foray from the Thames, suggesting a retention of the Saxon type (built less for bell-ringing than for refuge and observation of the enemy), such as might well have prevailed in the earliest Norman time, when the fear of the Dane was yet in the land.

Only in the tower have remains of Romanesque work been found. Lanfranc's building was no doubt largely of wood, cut from the oak forest of the vale, some portions of whose woodlands still remained at the beginning of this century.† In 1080 other stone than the coarse ironstone, whose rough fragments are found here and there on the top of the clay, must have been hard to get, and its carriage always a very arduous undertaking across the clay bottoms that lie on all sides between Harrow and

any quarry or wharf. Still, Lysons's assignment of the great round Tottenhoe pillars of the nave to Lanfranc shows a better appreciation of style than the guess-work of writers of our day, one of whom calls them early "fourteenth century," and another even fixes them to the date of Edward III.

His happy vagueness must really acquit Lysons of blame for the mystification of our contemporaries, who have with so much determination adopted the fourteenth century as the date of Harrow Church. Mr. Hartshorne, for example, in a paper read before the St. Paul's Ecclesiological Society in 1882, does not trust his eyes to examine the details of the church, but boldly advances the suggestion that if the mouldings look "thirteenth century," it is because they were made so by Scott's restoration of 1849. The stones themselves would rebut this theory, and the old prints of 1830 show that no such transformation of form took place. Yet Walford, in "Greater London," without hesitation, accepts Mr. Hartshorne's evidence, and stamping it with a precision of his own, declares that "the whole body of the church from the tower eastwards was apparently built in the first quarter of the fourteenth century;"* a statement that Mr. Percy Thornton varies after his own fancy in his "History of Harrow School" by fixing Edward III.'s reign as the part of the century wherein "the church was thought to have been rebuilt." But, as far as can be ascertained, no part of the nave of Harrow Church has either now, or has at any time had, the characteristics of fourteenth-century work, nor seems, indeed, within fifty years before or after that century. Archbishop Boniface held a visitation at Harrow in 1250; a chantry was founded by the rector in 1324; Weever in his "Sepulchral Monuments" says that there were monuments of the Flambers, and there still exists a brass of Sir John Flamberd, who held lands in Harrow in 1390. A broken slab in the doorway of the muniment-room seems also of the fourteenth century, and there is a brass too to John Byrkhed, a famous rector of 1418. These would appear the sole memorials that connect the church with the two hundred years from 1250 to 1450.

* Walford also says:—(1) that Scott lengthened the chancel in 1849; Lysons's print, however, shows that it was as long as now in his day: (2) that the noble timber roofs had been plastered, and were uncovered by Scott. The prints of 1830 show the roofs much as they are now.

* The Rev. W. Done Bushell has been collecting and printing many valuable documents that bear on the early history of Harrow.

* The existing arch into the church seems of the fifteenth century.

† Young oaks still spring up every year, and are cut down with the hay.

Yet a tablet set up under the tower advertises the subject of a stained-glass window—one of a series to be placed in the clearstory in illustration of the history of the church—thus: "Rebuilding of Harrow Church and addition of clearstory in Edward III.'s reign."

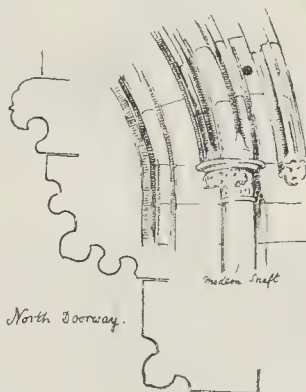
So slippery and long-lived is the Proteus of error; for has there not always been the sham "fourteenth-century" of the chancel to give it backing? The label affixed by such an authority as Sir Gilbert Scott, has been sufficient for most people, and the whole church has its dates misread to fit the supposition of a "restoration." Yet no stonework of the fourteenth century itself has ever been shown. Scott's building was all new, keeping only the core of the old south chancel wall. And, indeed, to those acquainted with the methods in which he worked, the presumption is not strong that his restoration forms were suggested by anything he either found or surmised.

It is satisfactory, therefore, that the find of last month proves two things—not only that there was once an Early English chancel, built not far from the year 1200; but also that Scott knew of this early work, but did his building nevertheless in the Decorated style. There have been found three internal jambs (two right and one left,) apparently parts of three lancets some 15 ft. high, but with nothing to show their width—or, indeed, whether they were round or plainly pointed, or trefoil headed. The shaping of what is left of the internal arches suggests the same early date, as do the piers of the chancel arch. There is a peculiar set off for the rere-arch that is also characteristic. It is this feature which shows Scott's knowledge of it, for he has copied it in his "Decorated" windows, an anachronism of about a hundred years. A good deal is left of the original plaster facing of the stonework, with its painting, and a subsequent repainting thereon in a hotter colouring. This latter is on one jamb a range of broad red chevrons, and on the adjoining (not yet fully displayed) what seems to be a lion garland. Should these be shown to belong to a particular coat-of-arms some evidence may be gained as to the date after which the thirteenth-century windows were blocked. From the nature of the filling it would seem certainly Gothic. In it has been found parts of a foiled arcade with a bit of Early English label, and also what would seem the portions of an internal string, of the same section as that of the Mytton Chapel at Bredon.

That Scott, though finding traces of this work, should have preferred to make his style that of a hundred years later, is, after all, natural under the circumstances of a restoration in 1849, a time when it was almost a matter of conscience to consider Decorated art as the most "Christian"—an excuse in itself for the demolition and alteration of our historic churches, if they did not conform to its standard. So, in style as in outline, his rebuilding departed from the original tradition of the church; and a wide, rather shapeless, north aisle, and beyond this again a vestry, was put to fill the north-east angle of the original cross-plan. It is fortunate that the nave did not suffer such a complete transformation. Externally, indeed, it was completely refaced in flint in place of the traditional plaster, and all its windows were renewed, save those of the north transept and aisle—which, however, some fifteen years ago had outside their old stone replaced by inferior; inside they still retain it. Most fortunately, too, owing to lack of funds, the tower was preserved from the mischief of a similar refacing. It was again rescued this last year, and it is to be hoped that the tradition of these escapes will form a precedent for its future preservation.

The south porch was completely re-surfaced; the north porch and stair-turret adjoining were built quite new. There are no prints to show what there was before on the north, but there may have been a seventeenth-cen-

tury staircase to the gallery here. The north doorway itself has, however, received less renewal than any other part of the fabric, and its mouldings and the ironwork of its



door are most valuable. Inside, everywhere, the stonework has been furnished up, and much of it renewed; the Bath stone usually shows what is the new, but in some cases additions have been made out of pieces of old stone. The walls everywhere were replastered, the oak roof thoroughly repaired and varnished (a fresh coat of treacle oil was put on a few years ago); but the great wood effigies, though defaced, it is said, by Cromwell's troops, were not effaced by "restoration." However, a clean sweep was made of the pewing and furniture of the church, with the exception of the font and part of the pulpit. Much of these fittings were, no doubt, dilapidated, and it must be said that sound, strong, oak seatings were put by Scott. But old water-colours and prints show much beautiful work in the screens and reading-desk, and their substitutes are ugly and mean. The sounding-board was exceptionally fine. It would be a real restoration if it could be found and put back, for the design of the pulpit has lost enormously by its disappearance. This, however, took place some years before the "restoration," though at that time other portions were removed and the staircase altered.

The crime of all these fittings in the eyes of the restorer of 1849 was their date from the seventeenth and eighteenth centuries, those dark ages to the ecclesiologist reared in the school of the "Revival." But it is painful to think of so much beauty of genuine devotion cast out and broken up, and to see nothing better come into its place than the tawdry insincerities of the ecclesiastical furnisher. Mr. Hartshorne, speaking in 1882 of this work of 49, and deploring with good reason the immense loss of what was both artistically and historically priceless which it occasioned, adds, "It was cheering to believe that a restoration of the kind which this church underwent would be impossible in the present day." Perhaps so; but these destructions were, at any rate, at the imperative, if mistaken, bidding of a religious enthusiasm; and, moreover, Scott's treatment of the chancel kept the tradition, if not the style, of that fuller lighting which, for convenience sake, thirteenth-century chancels almost always in later Medieval times received. He put his windows where there were windows before. But it is difficult to find excuse for what is now being done in 1895—the removal of his windows, and the substitution of a "restoration" still more dubious, that sets both tradition and convenience at defiance—from the fragments of three lights setting up five, and so uncertain of itself that it hesitates whether these shall be 10 in. or 14 in. wide! It should be

known upon what slender basis this work is resting; and it is to be hoped that, on the practical point of lighting only, Scott's restoration will again be re-restored.

Taking the church as we have it to-day, and reading the evidence of what is left to us, the great rebuilding, which settled for six centuries its extension and general outlines, was started late in the twelfth century or early in the thirteenth; the first half of the thirteenth century completed the fabric; the latter half of the fifteenth raised the body, the tower, and spire, and added the south porch; and Scott, in the middle of the nineteenth, put, on the north, the porch, the vestry, and chancel aisle.

The earliest "Early English" is shown in the chancel, in the piers of its arch;



in the nave, in the round massiveness of the pillars, and, to some extent, in the arch that opens from the south aisle into the south transept. Generally, the mouldings of the nave are those of the first half of the thirteenth century; but the entrances, especially the untouched work of the north doorway, with its original door and ironwork, are at the end of this period, and perhaps later again was built the archway (which seems an insertion) set between the north aisle and north transept. Some people see also an Early Decorated character in the labels and respond mouldings of the arches that open from the nave into the transepts, but there is hardly the delicacy of that late date, and the forms themselves have often been found associated with much earlier work, even with that of the twelfth century.

The fine scale and completeness of this thirteenth-century parish church must, no doubt, be attributed to the patronage of the archbishops, whose ownership of the Harrow manor made them not unfrequent visitors there in the twelfth and thirteenth centuries. Coming into residence at his manor-house—which certain remains* show to have been probably on the site of "the Grove" a house close to the north-east of the church—the prelate would desire a church worthy of his dignity, and a choir in which his attendant

* An ancient and very deep well, lined with stone, has been found.

centors could be fitly accommodated. The fine height and spaciousness of the nave-arch are very remarkable. Another peculiarity lies in the massive piers which in the western responds of the first bays in the chancel of the nave arcade. The fact that the transepts, with the arches above them, may have been later additions, is not suit the facts of the case. Old records show that before the "restoration" the abaci of the responds did not run through the piers as they now do. This and other peculiarities suggest that there might have been a wall, some 2 ft. thick, built right across the nave, and that probably the choir and transepts only formed the first complete building, the nave being set out but not immediately proceeded with.

When Archbishop Beckett visited Harrow in 1170 he seems to have come among his enemies, for even the parish clergy were hostile to him, and tried to do him injury. He went on to Canterbury, and there excommunicated them two days before his assassination. There is evidence to show that his successors in the see were not free from nervousness as to a similar fate, for their ordinances at Canterbury after the new building there became strict as to the admission of the public within the precincts of the choir. Here, at Harrow, on building the nave which was on occasion to be the chapel of the Archbishop, it may have been thought well to restrain a too-free admission of the public to the services held therein. The north transept, on which side was the Archbishop's entrance from his manor-house, would be walled off from the aisle, and the closure would be carried right across the aisle, leaving the parish admittance to the south transept only. At any rate, this supposition fits the fact of the arch from the aisle on the north side seeming to be a later insertion.

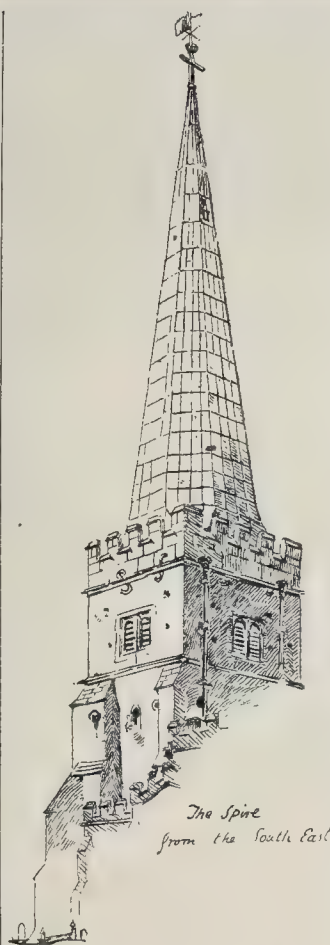
It is to be noted, also, that there was mainly a doorway before the "restoration" in this transept, close to the north pier of the chancel arch; and, on the other hand, no indication has been found of the usual door to the south side of the chancel. Of course, the enclosure and arrangements as we see here suggested are common enough in monastic churches which gave their naves to the parishes. Brecon Priory Church shows the north aisle solidly walled off in the transept, and at Canterbury itself there was a block in the same place caused by the Altar of the Virgin being there put. The exceptional circumstance of the chancel being to be used as the archbishop's chapel have led to the same arrangement being designed for a parish church at Harrow. All part would be probably finished with patch, making a wide pier necessary for abutment of the first arches, while the rest of the nave was proceeding more surely. Accordingly, the nave arcade in its details and arches shows somewhat later details. Above the piers can still be seen in the wall the inner jambs of the original clear-story windows, which were cut off by the fifteenth-century raising of the clear-story. It is odd that there seems to have been a window squeezed in between the west wall and the first arch. Thornhaugh, Northamptonshire, and Woodham Ferris, near Chelmsford, show just such thirteenth-century clear-stories, in each case over arcades that seem most of the twelfth century. With the building of the nave at Harrow went the raising of the tower; and if Scott, in his restoration, faithfully copied the newwork which he found in the fine double oct that lights the tower space, that window was put about 1250, and of much the same date seems the stair turret at the north-west angle of the tower. Somewhat later was the arch which we have mentioned inserted between north aisle and transept. In 1250 was Archbishop Boniface's visitation held at Harrow, and this probably marks the completion of the thirteenth-century church.

In the first quarter of the fourteenth century the Grange of Headstone, two miles, became the property of the archbishops,

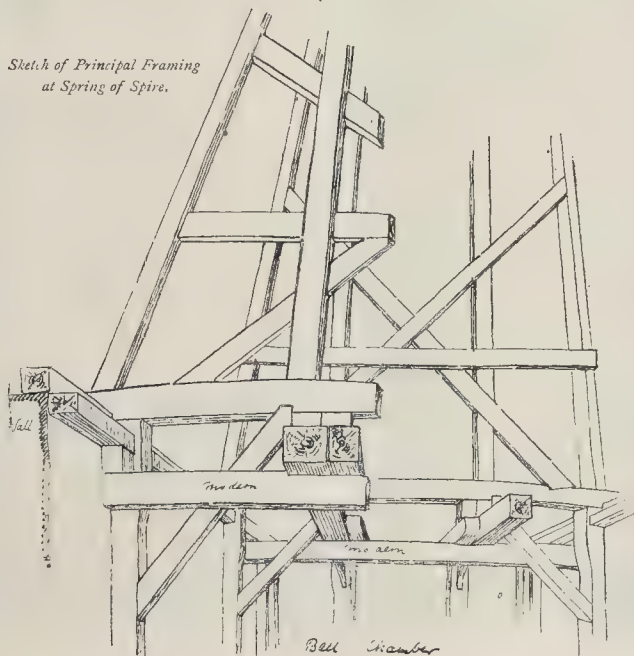
and thenceforward we do not hear of them at Harrow itself. Towards the end of this century new classes had come to the front, and we find here, as elsewhere, wealthy rectors and landowners commemorated by monuments and brasses in the churches, which they had doubtless adorned by their benefactions. A chantry had been founded in 1324, and there was a roodloft, for which the north transept arch has been raised to give head-room. The stair to it was found in the north pier of the chancel arch, but there are no indications of its date. Its erection may possibly have ensued on the removal of the archbishop's enclosures some time after 1260. No vestige of Mediaeval furniture is left, nor of the four altars which are said to have been in the church.

It was in the latter half of the fifteenth century that considerable alterations were made to Harrow Church, as to so many others in the wealthy parts of England. The noble clear-story was added to the nave, and both aisles and transepts raised—the original thirteenth century height being shown by a batter of the walls, some ten feet high. The windows were everywhere renewed, in chancel probably as well as nave, and the ceilings completed with fine massive flat roofs, richly carved and painted, corbelled all down the nave on great oak figures set in canopied niches. A part of one of these canopies with the original gilding is to be found in the "monument room." This room, over the porch, has escaped restoration. Its ceiling shows bits of the old painting, as also does a fine fifteenth century stone niche set on the east wall. There is now no stair to the room, but a door in the east side shows that it must have had an external entrance. The door into the church may have led to a private pew, or the room may have been in connexion with the chantry dedicated to the Virgin.

With the raising of the clear-story came the building of another story to the tower, and the setting thereon of the tall leaded spire, which makes Harrow such a conspicuous landmark. The internal construction of this spire, and the methods by which its strains are brought down inside to the lower stories of the tower, which at the same time or earlier had been much buttressed, make its framing a wonderful piece of carpentry. It was well and ingeniously



Sketch of Principal Framing at Spring of Spire.



strengthened by Scott, and bids fair to last another four hundred years.

It remains to speak of the font, which is of Purbeck marble, and a most beautiful piece of plain sculpture. In Lyons an engraving of it shows spurs at the base that have now gone. It seems at some time early in this century to have been removed from the church, and put up in a garden, but was returned before Scott's restoration. He added the stone base, and put a new rim. It is strange to find Mr. Hartshorne describing this fine work as "rudely carved, and probably a remnant of Lanfranc's church." Its material, as well as its workmanship, point to the last quarter of the twelfth century. The finely-cut lily of the bowl recalls the carving of the capital dug up in the nave of Strata Florida in 1888, and is like some other remains of Cistercian sculpture which have been put in the "Museum" at Fountains.

NOTES.

THOSE who have hitherto known Mr. E. A. Abbey only as a painter of *genre* pictures and an able illustrator in some of the American illustrated magazines, must have had a delightful surprise on visiting last Saturday the private view, at 9, Conduit-street, of his paintings for the decoration of the Public Library of Boston (U.S.A.). These form a portion of a series illustrating episodes in the history of the search for the Holy Grail in the Arthurian legend, the subject being treated so as to make Galahad the central figure, by concentrating on him some events which in the old legend belong to different knights, just as Tennyson has done to some extent in his "Idylls." A glance is sufficient to show that this is a collection of decorative paintings of more than ordinary interest and genius. Five of the pictures are completed; more are to follow. The first represents the visit of the angel bearing the Grail to the infant Galahad, a beautiful child who holds up his hands towards the sacred relic. This is the only one of the set which displays a purely decorative background, there being a mass of blank wall behind which is relieved by a pattern with conventional symbolic animals introduced. The second picture represents Galahad in complete chain armour, kneeling before departing on his quest, Sir Launcelot buckling on his spurs. The third is a much larger painting, the scene in which Galahad is led in by Joseph of Arimathea, as the rightful occupant of the "siege perilous." We see the great circle of the Round Table in perspective; on the right in the foreground King Arthur, a noble elderly figure in royal robes, rises in his richly-canopied seat to bow in homage to the young knight "clad in red sendel," who may sit where he himself dare not sit. Beside him an angel, stooping from above, draws away from the chair the crimson drapery which covered it, and the words "This is the seat of Galahad" glitter in gold over it. Above, on the left, a choir of white-robed angels, spectators of the event, repeat the circular line of the Round Table. The mystic letters referred to are a little too hard and defined, they do not appear quite as if glittering in the air. But as a whole this is a noble picture, and half persuades one of the reality of the legend. In the fourth picture the knights are worshipping previous to entering on the general quest for the Grail; Galahad, a beautifully spiritual figure, still in the red garment which distinguishes him throughout. The fifth picture, the largest of the series, is the scene in the castle of Amfortas, the wounded king who, with his household, is in a trance of ages. This is perhaps the finest of the series; the crowd of half-stupefied figures seated around in trance have a most impressive effect, especially by contrast with the dazzling procession of the Grail entering on the right. The supernatural splendour of the Grail, even through its

covering of "red samite," is remarkably conveyed; the figure carrying it closes her eyes from the glare; we feel that if the covering were removed we should have to turn away to avoid being dazzled. The fine decorative effect of the paintings is to be noted throughout; the gem-like glitter of the chain-armour in the second picture; the design of Arthur's throne in the third; the fine effect of the clustered shields with their devices in the fourth; the design of the bed or bier of Amfortas in the fifth, and the powerful effect of the mass of bronze and of dark furs in the centre of the picture, throwing out the effects of light on either side of it, and the red mass of Galahad's cloak. These are more than decorative work, however; they are noble poetic conceptions, and most heartily do we wish that they were going to decorate the walls of an English building, instead of going across the sea. It is to be hoped the remainder of the series, when completed, will also be exhibited in London.

WE much regret to have to record in our obituary paragraph the death of Mr. Paley, of Lancaster, whose name is familiar to all our readers as one of the ablest architects of the old Gothic revival school. Mr. Paley was not only eminent as an architect, but was greatly respected for his personal qualities, and the position which he occupied in Lancaster and its neighbourhood was a somewhat exceptional one. As an architect he was one of those who had most thoroughly caught the spirit of Medieval architecture, and his numerous churches and other buildings were distinguished by a breadth, massiveness, and simplicity of style, and a total absence of showy or florid detail, which rendered them among the finest and most satisfactory examples of the school of revived Gothic which for many years was predominant in England, and the traditions of which he steadily maintained and clung to. Apart from his profession, Mr. Paley was a man of much general culture and great personal charm of manner. In earlier days he was associated professionally with Mr. Edmund Sharpe, the well-known author of "Architectural Parallels," and their work was carried on under the style of "Sharpe & Paley." Mr. Sharpe retired from practice comparatively early in life, and subsequently the firm became that of "Paley & Austin," and, more recently, "Paley, Austin, & Paley." Mr. Austin had been, we believe, a pupil of Messrs. Sharpe & Paley.

THERE is much discussion at present between Austrian and German architects as to the merits of the modern architecture of their respective countries, and, primarily, of their capitals. The controversy has been taken up by the general press as well as by our architectural contemporaries, and there is much bitter feeling shown. The question was raised in connexion with the Emperor's criticism of Professor Wallot's new Houses of Parliament, when an eminent Vienna connoisseur most recklessly condemned everything in the building, and at the same time ridiculed all the new work done at Berlin. The Germans retorted, and, with a few exceptions, unfortunately similarly generalised their condemnation of their Austrian work. As outsiders, we should say that there is very little to choose between the work being done at the present moment in either of the two countries, but that the Germans, after years of mediocre academical work, are just passing through a transitional period that promises well. The Austrians, on the other hand, reached the pinnacle of refined academicalism ten years back, and seem to be now passing into the stage of eccentricity and over-elaboration in pursuit of the will-of-the-wisp of "originality." As to the mutual recriminations, English architects have hardly the right to make reflections, for we regret to say that it

is the rarest thing possible to find any English architect praise the work of another—unless in a Presidential address.

THE ambitious scheme of draining the Zuyder Zee, to which we referred some time back, will now probably soon be taken in hand. According to our Dutch contemporaries, the special Government Commission entrusted with the examination of the Zuyder Zee Society's scheme approve of the proposals. The plans are considered feasible and advantageous to the country, and the enormous cost to be incurred is expected to be covered by the sale of the ground reclaimed from the sea. The only question raised seems to refer to the powers of the National Exchequer to devote money to works which will at the best only return capital in full with a very small interest, and that some forty years hence. The general press, however, appears to be in favour of the expenditure, it only on account of the work it will find for the many unemployed. It is not intended to reclaim the whole of the area at present taken up by the Zee, but to leave a broad central waterway and a canal to Amsterdam. The Zee will be cut off from the North Sea by an enormous dyke, and then the "polders," or stretches of reclaimed land, will be gradually formed on either side. The whole of the works are estimated to cost over 26,000,000*l.* and will take about thirty years to complete. The sale of the reclaimed land is estimated to bring a return of 27,000,000*l.* The engineer who is responsible for the scheme as it now stands is Herr Lely, who some time back occupied the post of Minister of Waterways in the Dutch Government.

THE circular of the Education Department to the managers of elementary schools on the subject of taking precautions against fire is well-intentioned, but somewhat late in the day. The chances of fire, also, in school buildings during school hours are very slight. But for many reasons it is desirable that doors should open outward in these buildings; there may be at any time a crush against a door opening inward which in some way might cause danger to the limbs of the children. The Education Department would do well, however, to call the attention of the managers of the elementary schools to the desirability of seeing that the sanitary state of the houses which are frequently attached to schools and are inhabited by two or more teachers is satisfactory. The Department has no direct authority over these houses; they are not, so to say, "official" buildings, since it is a matter entirely in the hands of the managers to provide how accommodation or not as they please. But the Department, though it cannot control the sanitary state of these dwellings, is yet at liberty to give advice in regard to them. There is no doubt that many of these houses, more especially in the rural districts, are in an unsatisfactory sanitary state. The schools themselves are not all that could be wished, nor will they be until they are inspected periodically by competent sanitary inspectors. The cursory glance of the inspector—who visits the school once a year to test the knowledge of the pupils—in closets and dustbins is little better than farce.

THERE was a narrow escape of a theatre fire with a heavy loss of life during performance at the Darwen Theatre Royal last week. The fact of there being sufficient exits, and an energetic theatre manager; the auditorium, prevented any casualty from panic; whilst a handy hydrant, with spirited actor to use it, saved the house from destruction. We do not hear of a fireman having been on duty in the building. It is unnecessary to dwell on the risks: our theatres and public assembly-rooms; we would mention that last year has seen several of our provincial theatres burnt. Reading, Longton, and Southend, for instance.

Fortunately the fires, however, did not occur during the performance, and there was no loss of life. We should consider ourselves lucky that matters have been no worse, when we recollect the death-traps the public constantly enter.

MR. BLACKBOURN'S paper on the new Building Act, read at the Surveyors' Institution on the 21st, was in general favourable to the Act, and did not contain any very special criticisms. The author defended the form of words "The Council may permit," which occur so often in the Act, as allowing a desirable power of relaxing the conditions of the Act under special circumstances. Mr. Blackbourn makes one criticism, however, in which we concur, viz., that in the re-arrangement of the requirements as to thicknesses of walls, the best has not been done in regard to walls under 30 ft. He says: "The deficiency was not in strength, but in the manner of building, and in the impotency of an ordinary 9-in. wall to keep out damp. But if this latter was the view, why should any 9-in. external walls be allowed?" We are quite of the same opinion; we consider 9-in. walls are too thin for external walls of a habitable building. But what an outcry there would have been if they had been condemned!

ON Thursday, the 17th inst., Mr. F. W. Rudler, F.G.S., Curator of the Museum of Practical Geology, gave a lecture, at the Imperial Institute, on "Decorative Building Stones." A very good selection of marbles, serpentines, granites, &c., was arranged on the platform; they were mostly the property of the Institute, or of Mr. W. Brindley, who occupied the chair. The lecturer commenced by alluding to the well-known Egyptian porphyry, obtained from ancient quarries, a specimen of which was exhibited. The green porphyry of Laconia was compared with a similar rock from Lambay Island, off the Irish Coast, and these and the elvans and xullanite of Cornwall were described in much detail. It appeared to us that many of these stones, which are not now worked for decorative purposes, might well have been omitted from a general lecture of this kind, the more so as the chairman announced that the observations would especially refer to Colonial decorative stones. However, a porphyry from Chatham, in Quebec, and two or three other similar kinds of material were recognised. Then the porphyritic granites of Devon and Cornwall, and those from Shap, were taken as types of their order, and in speaking of granites generally the lecturer remarked that although Canada was rich in that class of stone it was practically unworked. This remark might have been somewhat modified, for we learn from the official statistics that the quantity of granite raised in the Dominion per annum is valued at about 14,000/. Canadian labradorite was described in some detail, after which the origin of marble was inquired into, when the time-honoured experiments of Sir J. Hall, who artificially made crystalline limestone by placing powdered earthy limestone in a closed gun-barrel and subjecting it to great heat, were brought into requisition. The geological horizons from which marbles have been obtained in the British Isles having been explained, as well as the nature of the materials themselves, we could not help noticing that undue prominence was given to those from the Wealden, Purbeck, and Forest Marble formations, whilst the Devonian and Carboniferous marbles—practically the only ones now raised—were barely mentioned, though two or three were alluded to. Speaking of the Carboniferous Limestone of Derbyshire, it was stated that part of the Imperial Institute was built of the stone from Hopton Wood, near Wirksworth, which is quite right, only a slight slip was made in saying that it does not take a good polish; it takes a very fine one when required. A few marbles from India next claimed attention, as well as

some from New South Wales and Natal. Alabasters and serpentines were given at great length; in connexion with the latter the "Irish green" of Ireland, that from the Lizard, and three or four ophi-calcites from the Colonies were taken as types. The lecture was interesting enough from some points of view, but we should have preferred to hear more concerning Colonial decorative stones actually raised, polished, and in the market, and less about certain materials that might fairly be regarded as "museum specimens" only.

THE application of photography to surveying, which is said to have originated with Colonel Laussedet forty-five years ago, has been since further developed on the Continent. The camera is placed on a known spot, the direction of the axis of the object-glass and the focal length of the lens is accurately determined, and the line of the horizon is marked. The photograph taken is laid on a sheet of paper, upon which the direction from the point of observation of all the points in the picture can be plotted. Two photographs of the same object taken from different known points define completely the position of each object, and enable altitudes to be determined. In a recent contribution on this subject by M. E. Monet to the "Mémoires et Compte Rendu" of the Société des Ingénieurs Civils there are described and illustrated the types of apparatus used in "photogrammetry"; some being specially arranged for surveying work, while others are adaptations of the ordinary photographic camera. M. Monet has invented a special instrument for determining the altitudes of points appearing on the photograph, by what he calls the "hypnometric rule." The elements for determining the altitude above the horizontal plane of vision are the perpendicular distance of the point in the picture from the horizon and the distance of the point from the place of observation, two photographs taken from different known positions being used.

WE may draw the attention of our readers to the current number of the *Quarterly Review*, which contains three articles that may be of special interest to many of them, viz., one on "The Ordnance Survey," one on "Lost Masterpieces of Greek Sculpture," and one on "The Methods of the New Trades Unionism." The article on the Ordnance Survey is to a considerable extent a defence of the Survey against various criticisms which have been levelled against it lately, and the *Quarterly Review* argues that whatever may be said as to defects—some of them such as ought to be avoided in our set of Ordnance Survey maps—no other country can, on the whole, show anything equal to them. We are inclined to think that the deficiencies which exist are largely due to restriction in the funds expended, and that there is not really money enough and labour enough employed for the task of keeping the maps up to date.

THERE are a great many very dull pictures to be seen at the "Scotland" exhibition at the Grafton Gallery, and even the juxtaposition of a good many of Raeburn's pictures serves to show that the attempts sometimes made to set him up as the equal of Reynolds are not justifiable. He was a fine, solid, and powerful portrait painter, but he has not the variety of Reynolds or Gainsborough, and it is only in a few isolated works that he at all reminds one of Reynolds's inspiration in dealing with colour. Among those which do show originality of colour are, for instance, "Lady Mackenzie" (16), and "Mrs. Gregory" (53), which latter, however, looks rather, in general style and pose, like a leaf out of Romney's book, as the charming half-length of "Mrs. Hamilton, of Pencailand" (144) is a leaf out of Gainsborough's. The light portrait of Mrs. Vere and the dark one of Mrs. Hope (78 and 80) are beautiful

works and form an effective contrast. But Raeburn's best powers were shown in his vigorous and characteristic portraits of men, such as that of General Mackenzie Fraser (115), and some others here, in which the strongly-marked Scottish character and vigour of countenance has found a most able interpreter. His "Yellow Boy" (118), a challenge of course to Gainsborough's "Blue Boy," is a woful failure from that point of view. It is interesting to find a good many of the landscapes of Thompson of Duddingston collected here, and curious to think that some of them, at all events, could ever have been seriously regarded as fine landscapes. Others, however, such as "Innerwick Castle" (107), "Loch Scavaig" (100), and "Loch Coruisk" (87) are really fine, though very conventional and restricted in colour. The central cases contain a good many interesting examples of Highland arms and other accoutrements; the number of dagger-sheaths with a knife and fork sheath combined are curiously suggestive of the roving life of their wearers; these, and some of the Ferrara broadswords, with the hacks on both edges telling of arduous cutting and guarding, bring about one an atmosphere of the Waverley Novels. There is some old silver, of which the best examples (artistically) are the more simple ones; see some of those lent by Mr. Murdoch of Capelrig (215). In an adjoining case is the actual whistle—the "whistle of worth"—won by Craigdarroch as the last man of the party sober enough to blow it, on the occasion celebrated in Burns's well-known lines.

THE ARCHITECTURAL ASSOCIATION: BRICKS AND BRICKWORK.

THE ordinary fortnightly meeting of the members of the Architectural Association was held on the 18th inst., at the meeting-room of the Royal Institute of British Architects, 9, Conduit-street, W., Mr. E. W. Mountford, President, occupying the chair.

The minutes of the previous meeting having been read and confirmed, Mr. R. A. S. Macalister was elected a member of the Association.

Mr. F. T. W. Goldsmith, the senior honorary secretary, announced the following donations to the library: "The London Building Act, 1804," presented by Mr. Bernard Dicksee; "Half-Timbered Houses and Carved Oak Furniture of the 16th and 17th Centuries," presented by the A. A. Sketch Book Committee; also a copy of each part of the A. A. Sketch Book, as published by the A. A. Sketch Book Committee. Mr. Goldsmith added that the committee lent a copy of each part for exhibition in the common room as published. The Post Office Directory for 1895 and Whitaker's Almanack had been presented to the common room by Mr. W. G. B. Lewis.

Mr. Banister F. Fletcher, junior honorary secretary, announced that the first spring visit of the Association would take place on Saturday, February 2, to the Church House, Dean's Yard, Westminster, where he thought they would be met by Sir Arthur Blomfield, who would explain the place. Members were asked to meet at the Church House at 3 p.m. A lecture on "Chemistry of Building Materials" would be delivered on Tuesday, January 20, and those who intended to join the class were requested to send in their names as soon as possible.

Mr. John Slater then read the following paper on "Bricks and Brickwork":—

The history of the development of the human dwelling, if worked out thoroughly in a scientific spirit would not only be a subject of the deepest interest to all who have to do with modern buildings, but would clear up many of the knotty points upon which archaeologists have never been able to agree. The first rudiments of building were undoubtedly the cutting down and joining together of substantial pieces of timber, and as men grew more expert in the use of their rude implements, simple patterns would be cut in the timber, the repetition of which would form a band of ornament, and we should have the commencement of a timber style of architecture.

In China and Japan such a timber style has survived with the growth of civilisation, and very picturesque results are obtained from the elaborate carvings and decorations with which these buildings were enriched. But, as a rule, with advancing intelligence and manual skill, and with the

discovery of the use of metals, men would not fail to contrast the ephemeral and destructive character of their timber dwellings with the hard, dense, and apparently imperishable nature of the rocks and stones which formed the everlasting hills which they saw around them. And you must remember that, although no means of quarrying then existed—Nature herself is the most efficient quarryman. Water and frost, heat and cold, will in the course of ages break up into manageable sizes the hardest rocks, and I do not think there can be a doubt that the earliest stone buildings were formed of rough pieces of rock picked up haphazard and roughly fitted together, the interstices being filled in with some softer materials, such as clay, earth, or sand. Anyone who has examined the remains of the early British villages which exist in many parts of Cornwall, or the very interesting chapel of St. Piran in that county, which dates from the seventh century, cannot fail to be struck by the fact that, as far as the walls are concerned, the stones had no work on them at all, and were simply brought to the spot just as they were found on the hill-side and placed in position as they happened to fit. The probability is that the first enterprising tribesman who built himself a stone dwelling, would run the risk of having it pulled down about his ears by his neighbours for his presumption, but gradually his example would be followed, and we should have the rudiments of a stone architecture.

But in many places as the population increased communities would settle down in districts where no stone existed and where the soil was chiefly of clay. Here the enterprising builder would find no hard material ready for his use, but he would notice how in summer this clay became exceedingly hard when the sun beat down on it, and the ingenious man would one day be struck with the idea that if he could dig up lumps of clay when it was soft, of a size that could easily be carried, and let the sun harden them, he would be able to transport them where he liked and use them to make a house with; and in this you have the first beginning of a brick architecture.

The use of unburnt, sun-dried bricks dates back to a hoary antiquity; they were made and used for all kinds of building in Egypt, Greece, where the palace of Cressus and that of King Mausolus were thus constructed, Assyria, and Persia, and in hot, sunny countries they are still used to-day. Chopped straw was mixed with the clay in order to give it a consistency, and where very little rain fell, these bricks answered fairly well. In fact, they formed the principal material with which the enormous and elaborate Ninevite and Babylonish palaces were constructed. If not very carefully tempered, these sun-dried bricks soon become very friable; and it is owing to this fact that of the majority of these wonderful cities of the East which we read of in history, nothing now remains but a heap of earth and rubbish. But it is also to the fact that the rubbish appeared absolutely valueless, that we owe some of the most interesting discoveries of recent years. Wherever any old stone buildings existed that became ruinous or deserted, the neighbouring inhabitants invariably used them as a quarry and carried away the stone for their own use; but in Assyria no one ever thought it worth while to cart away crumbling clay and earth. Some few years ago a Frenchman named Botta obtained the requisite permission to excavate one of these huge mounds in the desert, with only a few straggling huts around it. His explorations were continued by M. Victor Place, and the result was most unexpected, and showed that many of our architectural forms and features have a much greater antiquity than any one imagined. One can easily understand that in a clay district it would soon become apparent that artificial heat, such as might be obtained from a cooking-place, hardened the clay and altered its colour, but few can have imagined the use that was made of the knowledge of this property in the clay for the production of decorative effects.

These excavations took place about 12 kilometres from the Tigris, at a little village the modern name of which is Khorsabad, which is on the site of the great palace built by King Sargon. Buried under the debris of centuries was found a walled city with fine gateways, the palace itself with a magnificent arched gateway of brick, the voussours being carefully moulded to the proper shape and enamelled in various tints, forming a beautiful pattern, and as vivid as if they were lately taken from the kiln. Artificially burnt bricks used for paving, and so hard that when struck they rang like a bell, and the discoverers used them as paving for the floor of their temporary stables; arched covers for sewers formed of radiating bricks accurately moulded, and glazed wall-tiles in profusion were discovered.

The sizes of the bricks varied considerably, the paving bricks being about 1½ in. square and 2½ in. thick, and these were carefully laid in two courses, breaking joint; their colour was a dull red, approaching brown. The arch-bricks in the conduits or sewers were curiously formed, every alternate course having a keystone of peculiar shape, and M. Place's belief is that the intervals were keyed with ordinary unbaked bricks, thus affording, in case of repairs being required, an easy means of entering the sewer. The height of the walls of the palace was about 15 metres, or 49 ft., and their thickness 5 metres, while the height of the encircling wall of the city itself was about 23 metres, and the thickness nearly 8 metres. The gateways, both of the city and the palace, were of such a kind as one would never have expected, being true arches, openings about 14 ft. in width and 21 ft. high, the arches being formed of four rows of bricks very carefully laid, with radiating joints. It is a most extraordinary thing to find these old Assyrian builders planning and executing so fine a work as this. There is one peculiarity about these glazed bricks: although their colour was perfect and the bricks themselves uninjured, they were comparatively soft, and the part built into the wall could be deformed by the mere pressure of the hand.

Although, as I have stated, bricks were used in Greece, yet the abundance of excellent marble in that country prevented builders having recourse to an artificial material. In Rome, however, and her colonies brick was extensively used, although recent investigations have shown that many of the old Roman buildings which were supposed to be erected of solid brick are really only brick-faced, and that the interior of the walls is concrete of the most admirable kind. Apart from this, however, there can be no doubt the Romans were excellent brickmakers, as is evidenced by the present condition of many buildings which were erected in various parts of Europe and this country during the Roman occupation. Take the Basilica at Trèves, for instance, nearly the whole of one side of which is the original brickwork, as well as the lofty arch between the apse and the main body of the building, and if you examine it carefully you will see that there was no stamping in that work. The excellence of Roman bricks is further shown by the fact that in many parts of this country what are undoubtedly Roman bricks that have been taken from some vanished building and re-used in other places are still found in an unimpaired condition of strength. St. Albans Abbey may be mentioned, where such bricks occur in large quantities, Dover Castle, and many other places. It may be interesting to notice the size of Roman bricks, which are chiefly remarkable for their length and thinness. Vitruvius enumerates three kinds of bricks: the pentadron, 14½ in. square and 1½ in. thick; the tetradron, 11½ in. square and 1½ in. thick; and the didoron, 8½ in. × 5 in. × 1½ in.; the two former being used chiefly in Greek buildings, and the latter in the Roman buildings of his time. The size of Roman bricks varies considerably: at St. Albans they are found 18 in. × 12 in. × 1½ in., in the old London Wall 17½ in. × 11½ in. × 1½ in., while I myself have measured some in Colchester Castle about 15 in. long and barely 1 in. thick. After the close of the Roman dominion, brickmaking, as well as nearly all other arts and sciences, fell into decay, and it is a curious fact that, whether in the British Isles or on the Continent, we have very few remains of any brickwork that is not Roman until about the thirteenth century. St. Sernin, at Toulouse, a church of the twelfth century, is partially built of brick, but the convent of the Jacobins at Toulouse, dating from the end of the thirteenth century, is one of the finest examples of brick building in the Middle Ages. As Viollet-le-Duc points out, it is in this part of France that good building stone is entirely wanting, and consequently the architects of the time were compelled to elaborate a style of their own in the only available material, brick. In the thirteenth, fourteenth, and fifteenth centuries French bricks were of large size, about 13 in. × 9½ in. × 2½ in., and the mortar joints were frequently within a fraction of an inch as thick as the bricks themselves. Moulded bricks are but rarely met with, but cut brickwork of very interesting character is found much oftener. It is clear to my mind that Viollet-le-Duc, with all his wide knowledge and versatility, held brick architecture in somewhat low estimation, for two pages in his *Dictionnaire* dispose of the subject.

In Germany you will find brick largely used in those districts where stone is poor and scarce, but the general mode of treatment in that country is somewhat heavy and uninteresting. There are,

however, many fine examples. The Marienkirche at Lübeck, dating from the end of the thirteenth century, is one of the best specimens of German brick architecture, and this church had great influence on the style of the surrounding parts of the country. At Brandenburg on the Havel is the fine church of St. Catherine, late fourteenth century, which has one of the most elaborately ornamented exteriors of any brick edifice. I have some diagrams of characteristic German brickwork. One is a gable from Thorn which is an old fortified town in North-East Germany, on the Vistula. Another is a window from a church at Dobrilugk, a small town on the line from Berlin to Dresden; the third is a nullion of one of the windows of the church of Saints Mary and Nicholas at Frankfurt-on-the-Oder. At Preslau on the Uckersee is the very fine Gothic church of St. Mary, dating from 1340, but now restored; and there is one from Seebau. I have noticed one peculiarity in modern brick buildings in Germany, which is this—joints are left raked out for a depth of about half an inch from the face of the work as if for pointing, but no pointing is inserted. In appearance the effect is not bad, but I should think it must increase the tendency of wet to soak through the walls.

In Spain—my acquaintance with which country is as yet, I regret to say, confined to second-hand knowledge—brick was used extensively and effectively in the Middle Ages, though in a manner quite distinct from that which prevails in other parts of Europe. Mr. Street has little doubt that by far the larger part of the brickwork in Spain was done by Moorish workmen, who retained their old constructive traditions. The special peculiarity of Spanish brickwork seems to be that it was rarely moulded, and effect was obtained by simple projections, as at Zaragoza, where patterns are formed by setting forward the bricks forming the outlines from one and a half to two inches beyond the general face of the wall and filling up the spaces with a diaper of small tiles. All the Spanish bricks are narrower a little over one and a half inch thick—and the mortar joints are half an inch thick. The Torre Nueva, in the same city, used to be one of the very finest specimens of brick architecture, octagonal on plan and the faces covered with diaper; but, unfortunately, as you are probably aware, has most interesting relic of the Middle Ages has very recently been taken down because of its leaning so much out of the perpendicular. At Toledo the churches of San Roman and San Magdalena are excellent examples of the simple and proper use of brickwork. One of the diagrams shows the campanile of this church. The construction is rubble stone with string courses and quoins of bricks perfectly square and with very thick mortar joints. As I have for some time had a great distaste for what is called gauged brickwork, where the bricks are rubbed down and set in putty with as fine a joint as can be made, Mr. Street's opinion on the effect of these thick joints is gratifying as well as interesting. He says of Santa Magdalena:—"The bricks are used very roughly and picturesquely, with a very thick mortar joint, and the consequence is that every part of this work has value in texture and light and shade undiminished by those who have never seen anything but our own smooth, smart, and spiritless model bricks, built with bad bricks and no mortar." And he goes on to say, in a note, "I am aware that, in saying this, I blame myself as much as any one else."

The Netherlands are rich in brick buildings, and I know nothing much more interesting than ramble through the narrow streets of some of the Flemish cities where each house seems to try and outdo its neighbour in the quaintness and originality of its steep brick gables. Picturesque, however, as these are, they always strike me as somewhat wanting in grace and refinement. They are the honest and often successful efforts to escape from monotony of a somewhat rough and uncouth race, whose exuberant genius was unrestrained by any knowledge of or love for proportion such as is shown in classic architecture. The general effect is quite charming, and we, who are accustomed, in the majority of our English cities, to the horrible monotony of a straight skyline formed by a parapet which completely conceals the roofs, can readily forgive the quaint fancy which is riot in these stepped gables, but the detail is often unsatisfactory, and it is not till we visit North Central Italy, where the Roman genius and classical traditions had lingered longest, and where the strength of the Northern Gothic was restrained and curbed by the Southern love of colour and

refinement, that we find the highest development of a brick style in architecture, and an examination of these buildings will, I think, effectively dispel the notion which some people used to be so fond of holding, that brick is a vulgar and inferior material, unfit for use in a large monumental edifice.

Street's volume on "Brick and Marble in North Italy" came nearly forty years ago as a revelation to many, and the swing of the pendulum which, during the last few years, has sent Gothic art out of fashion and has brought to the fore a style which, with all its merits, appears to me to carry in itself the seeds of its downfall and decline as surely now as at the time of its first inception, in that lack of reserve and striving after the *outré* and the fantastic which speedily swamped what was true and good and beautiful in the Renaissance, and led to all the monstrosities of the *rococo*—this late rebound, I say, may very probably have prevented the student of the present day from giving that attention to the Gothic architecture of North Italy which it well deserves. Personally, I know of no more delightful field of study, and can only regret that circumstances have not allowed me to visit it more frequently. The lovely variety of tint of the mingled brick and stonework, the juxtaposition of the circular and pointed arch, and, above all, the charming simplicity with which the most beautiful effects are produced, all combine to make the architecture of this district unequalled in attractiveness.

Take Verona, for instance—the city which lives in my recollection as the most picturesque in its surroundings and the most interesting in its buildings of any that I have ever visited. The first thing that strikes the eye here is the noble campanile which rises from the group of buildings at the corner of the Piazza dei Signori to a height of nearly 320 ft., though its lower part is concealed by surrounding buildings. It is built at first in alternate courses of brick and stone and then wholly of bricks. For more than half its height it is quite plain, entirely without buttresses, and pierced by three or four small openings only, and then there is a belfry stage, above which is an octagonal story of later date. The belfry windows are contained under a large pointed arch, and are divided into three lights, with coupled marble columns, the voussours of the arches being alternately of brick and stone. Verona is absolutely full of objects of interest, but I can only mention a few as illustrating my subject. The cloisters of the Church of San Zeno are, to my mind, some of the most beautiful I have seen. The arches are of brick pointed on two sides of the quadrangle and round on the other two, and on one side is a small projecting arcade; they are without mouldings, and are supported on coupled columns of red marble.

The arading of San Fermo Maggiore may also be mentioned; and strolling along the narrow streets of the city numerous interesting bits of brickwork will be discovered. There is one special characteristic of the treatment of brick and stone in Verona, namely, the introduction of narrow courses of bricks between the arch stones and the plain walling, or between two rings of voussours. This serves to accentuate the arch and to keep it distinct from the main body of the wall, and is an effect that might well be imitated in our own buildings. Venice, which, of course, has a charm all its own, is not very rich in examples of brickwork—rather, perhaps, I should say that the examples are not of such excellence as in other Italian cities. The church of the Frari is one of the most interesting examples, and there are one or two early campaniles in brick, San Giacomo del Rialto being the best. San Giovanni e Paolo, or Zanipolo as it is called, has an elaborate cornice. It would be both easy and interesting to devote some time to the description of other Italian cities, such as Brescia, Mantua, and especially Cremona, but these would almost demand an evening for themselves; but there is one Italian city which must not be passed over, as it is built entirely of brick—I mean Bologna. The first view of its heavily-arcaded streets is undoubtedly somewhat depressing, but the student of brickwork will find any number of most interesting details. The magnificent church of San Petronio is almost entirely of brick, both inside and outside, and is most impressive from its grand proportions and the excessive simplicity of all its details. There can be little doubt that this church exercised considerable influence on Street, as is shown in some of the late churches which he built. But it is for its domestic work that I think Bologna most interesting, as it shows us with how little trouble and expense we can increase the architectural effect of our plain brick buildings. The brick cornices and corbel tables show any

amount of variety. With these few and very inadequate remarks I must leave the subject of Italian brickwork, strongly advising everyone who has not yet done so to take the earliest opportunity of making acquaintance with it, or if that is impossible at first hand, to study Street's book on it.

In our own country after the Roman occupation terminated, very little seems to have been done in brick until the fifteenth century, although there is one building—Little Wenham Hall in Suffolk—which dates from the end of the thirteenth century. The bricks here are interspersed with stone and flint courses, and the bricks are of widely different shapes and sizes, and when I visited the building a few years ago with a few architectural friends, we came to the conclusion that it is very probable the bricks were not made purposely for the building. In the Eastern Counties bricks were largely used during the fifteenth and following centuries, one of the finest examples being Layer Marney Hall, Essex, which has been frequently illustrated. Who was the architect of this building is not, I believe, known, but he was certainly a man of considerable ability, and I am disposed to think, familiar with some of the Italian terra-cotta work, as not only in the main building, but in the outbuildings also, there are several charming little bits of moulded brickwork. Sutton Place, near Guildford, is a beautiful example of brickwork; but here the influence of Italian Renaissance is manifest, and there can be little doubt that Italian workmen were employed on this building. The detail is pure, the ornament refined.

In Queen Anne's reign English brickwork was under the full domination of the Renaissance, and truly wonderful was the result. As far as workmanship goes, it was admirable. Pilasters, cornices, panels, swags, bunches of fruit and baskets, and, in fact, all imaginable detail was formed of cut bricks with an ingenuity and at a cost of labour that almost excites one's pity. I quite admit the charm of some of the older and simpler forms of this style that are met with most frequently in old country towns where age has given a mellowness to the work, and where nature has so often added to the picturesqueness by the creepers which have overgrown the exterior; but of the later developments of the original style and of the modern imitations of it, what can we say? I am aware that I am on somewhat delicate ground here, and I feel perfectly that my own opinion is a mere personal matter and worth no more than any other person's; but I can only say that much of the modern brickwork in imitation of the Queen Anne style fills me with horror and detestation. When I see pilasters tacked on to a front which not only have an exaggerated enfilade at their sides, but come bellying out in front like the sails of a ship, they remind me of the fable of the frog and the bull, and the bricks seem swollen with conceit at having attained to a form utterly foreign to their nature. And it is this, rather than the ugliness, which I so strongly object to. Brick is a hard material, moulded and baked in a kiln, and moulded bricks seem to me perfectly legitimate; but surely the original baked surface is the most fitting to resist the weather, and if you go and rub and cut all the surface off, and then give the material a shape and form utterly foreign to its nature, you are completely reversing the practice of the Medieval builders, who have left us the most magnificent examples of their skill, and who invariably gave to each material they employed the ornamental treatment which it was best fitted to receive. Much of this modern treatment of brickwork seems to me on all fours with, and just as reprehensible as, the practice which prevailed in the early part of the century in London houses, where we find a small porch carried by what appears to be a solid stone column of the Doric order, but which turns out to be constructed of wood bent to a circular shape and kept there with an infinity of trouble. In each case the material has been tortured, and bears on its face the imprint of its suffering. Having now given you a very rapid and incomplete *resumé* of the historical part of my subject I come to the second portion of what I have to say to you this evening, which relates to the actual materials with which our brickwork is constructed. I do not think it necessary to occupy your time with any detailed account of general brick-making, as you can get the information from the various text-books which treat of the subject. You know there are two main distinctions in bricks, viz., clamp-burnt bricks and kiln-burnt bricks; in the one case the fuel being mixed with the clay and all being burnt together, of which kind a London stock is an example; and in the other case the brick being formed of the

clay, or rather the mixture of clays and sand and other ingredients—because it is quite exceptional to find a clay that of itself will make good bricks—and then being baked in a kiln, of which there are many different sorts. The thorough tempering of the clay, and mixing it well together, are very important points to be attended to. A very large quantity of brick-making machinery is now in use, and a great deal of stuff that years ago would have been quite useless is now ground up and made into bricks, and the heavy machine-presses give a smooth face to many a brick which is really not at all fit for use in a building, at any rate when exposed to the weather. You will often find that a smooth-faced pressed brick will flake off. I have particularly noticed this in the inferior kinds of white Cambridgeshire bricks and in those made near Hitchin and in that neighbourhood; and the reason is, I believe, that the outer layers of the bricks get more consolidated than the inner ones, and a loss of homogeneity is the result.

The use of glazed bricks in buildings has very largely increased during the last ten years, and as I have myself been using a very large number in a factory which I am building, I took the opportunity last month of going over one of the large Leeds fire-brick works, and a short description of this kind of brick may not be uninteresting to you. The Leeds bed of fire-clay extends for a distance of six or seven miles only, and is associated with a thin seam of coal. The depth at which the clay is found varies from about 100 to 300 ft., and the seams are about 2 ft. 6 in. thick. The following is an average analysis of the material, and in the diagram on which this is shown I have put alongside it the analysis of an ordinary brick clay, that you may compare the two.

Fire-Clay.	Ordinary Clay.
Silica (Si O ₂)	68.74
Alumina (Al ₂ O ₃)	18.04
Oxide of Iron (Fe ₂ O ₃)	1.45
Lime (Ca O)	0.19
Magnesia (Mg O)	0.03
Alkalies	0.05
Water	2.25
Organic Matter	8.20

The clay, except where found quite near the surface, is almost as hard as rock, and has to be dug with a pick much in the same way as coal. The clay must be exposed for some time in the air to get thoroughly weathered, and then is sorted in order that all the particles of coal, ironstone, and shale may be removed, as these spoil the brick. The clay is then crushed in a sort of mortar-mill with a perforated bottom, having holes about $\frac{1}{2}$ in. diameter. It is then taken to the tempering-pan, where water is mixed with it to bring it to the proper consistency. The tempered clay is then taken to the moulder, who forms the brick, and then it goes to the drying-floors to stiffen. After that it goes to the presser and is very carefully weighed, because if one brick has more clay in it than another, the contraction during burning would be different, and the sizes would not agree. It is then pressed in a small machine worked by hand, and gauged and fettled up, and is soon ready for the dip. There are two kinds of material in which the faces of the bricks intended to be glazed are dipped; the first is called the body, and the other the glaze. Different firms have different recipes for body and glaze, but the materials used for body are Ball clay or blue clay, Cornish stone, flint, china clay, and plaster of Paris, in different quantities. These are calcined and ground to the finest possible trituration, mixed with water, and passed several times through a fine brass-wire sieve, having 120 meshes to the inch. The glaze is made of Cornish stone, felspar, flint, whiting, and plaster of Paris. After being dipped in the body, the brick is left till the shine goes off its face, and is then dipped in the glaze.

The materials which I have mentioned will give only an ivory or white brick; if other tints are required, such substances as oxide of cobalt, green chrome, bichromate of potash, or manganese, are mixed with the glaze. Some stains, however, will not retain their colour in the heat required for a hard glaze, such as red and deep maroon, and in such cases the bricks are enamelled. In this process the enamel colour is mixed with a flux and ground together, and then, when quite dry, an oil formed of turpentine and resin is mixed with it, and the mixture is applied with a flat camel's-hair brush to the surface of the brick, which has already been dipped in body.

The bricks are then ready for burning, the kilns in which they are burnt holding from 18,000 to 20,000 bricks. Various coloured bricks may

be burnt together, and experience shows what position in the kiln is best for the various colours. The glazed face must never be exposed to the flame. The kiln takes roughly about three days to burn and three days to cool, and uses about 25 tons of good coal. The brown salt-glazed bricks are made by simply throwing common salt into the fire when the bricks are burning. I am indebted to the Wortley Fire Clay Company, Leeds, for very kindly supplying me with the information enabling me to give you this short description of glazed-brick manufacture, and they have sent me up specimens of the stuff and the manufactured article.

To return to ordinary bricks. What is a good brick? Speaking generally, the characteristics of a good brick are:—1. Regularity of shape, so that when built into a wall the pressure is equal over its surface. 2. Toughness as opposed to brittleness, *i.e.*, it ought not to snap when broken, but should require two or three hard blows. 3. Clearness of ring when gently knocked against another brick, and not a dull, heavy thud. 4. Homogeneity of surface and texture in the interior, and above all absence of small stones and pebbles or lumps of chalk; and 5. non-porosity, *i.e.*, a slowness in absorbing water. I am very much disposed to think the latter quality the most important, and one that is perhaps least attended to. I mean, of course, with facing bricks. The rate at which a brick—or, for that matter, stone either—absorbs water is a more important element in its goodness than its total absorptive power, because when built in a wall the bricks are exposed only to intermittent wettings, and if in testing two samples of brick I were to find that one absorbed 15 per cent. of its volume of water in the course of an hour, while another absorbed 20 per cent., but took four hours to do it, I should prefer the latter. The crushing strength of a brick is an interesting subject of inquiry, but practically you will find it very rare indeed for bricks to be exposed in walls to anything approaching this crushing strain. Professor Unwin, at the Central Institution, Kensington, kindly tested some bricks for me a few months ago, and it was found that a Leicester brick was crushed with a load of 245 tons per square foot, a Coventry brick at 217 tons, and a London stock at 125 tons, while a blue Staffordshire brick only cracked under a load of 385 tons per square foot, and could not be broken by the machine. A two-brick wall carried up 102 ft. high, which is of course much higher than would ever be done in practice, would exercise a pressure of five tons per square foot on the lowest course, and this will show you how small is the chance of a brick itself being crushed; but a brick and brickwork are two very different things; the intervention of the mortar-joints introducing an entirely new element. Brick piers are very awkward things to experiment upon, and require very special machinery; but some practical experiments upon them have been made in the United States, and you may take it that three tons per square foot in mortar and five tons in cement are about the safe loads that should be placed on brickwork.

A gentleman whom I have not the pleasure of knowing has suggested to the secretary that it would be very instructive if I were to show some specimens of bad bricks, and point out how to find them out. The reason why some bricks in a clamp or kiln are good and others bad—irrespective of their position—is very difficult to understand even by practical brickmakers, but the most eminent firms are quite willing to admit that they do get a number of bad bricks, and one gentleman told me that out of a very large number of burnings his experience would lead him to the conclusion that 30 per cent. on an average were of inferior quality. What becomes of this 30 per cent.? One practical point is never to be guided in choice of a brick by colour alone, as it may frequently happen that what looks like an excellent brick may really be as bad as they make them. Knock them together and see how they ring: a bad brick will never ring well, and then break the brick and see its interior. If you see pebbles, or find the interior soft and not of close texture, you may safely condemn the bricks. A number of specimens of bricks were then shown and commented on by Mr. Slater.

Underburning is, I believe, a fruitful cause of inferiority in bricks, as they are then soft and friable; and from my own observation I should say that, if you notice a load of bricks coming on to a job, with a large number of broken ones among them, the chances are that the bulk of the bricks are bad ones, and they should be rejected. This is altogether apart from the risk to the work owing to the temptation to the men to use snap

headers. To revert for a moment to the question of porosity. I believe if in an ordinary brick wall you were to pour water on the face at a level of about 6 ft. from the ground, none of it would run down as far as the ground; the water would get absorbed before it reached so far; and this with very fair bricks. It may be of interest to you to know of an easy method of rendering a brick wall almost, if not quite, impervious to water. Wash the surface over with a solution of soft-soap and water, about half-a-pound to a gallon, laid on with a soft brush; and, when that has dried, apply a solution of alum and water, mixed in the same proportions, and the result will be that you have waterproofed the wall.

It goes without saying that however good your bricks may be you will never get good brickwork unless good mortar is used, and any one who is in the habit of inspecting old houses will have noticed that in nineteen cases out of twenty it is the mortar which has perished and not the bricks. In fact, I believe a good brick is just as good after one hundred years' use as when it was new. I am sure the difficulty which public officers have with the speculating builder lies more frequently with the composition of this than with the bricks. The stuff which the "highly respectable building-man" will endeavour to pass off as sand is of a fearful and wonderful nature. Sometimes he will use sand, but of such a soft, sugary texture, with no sharpness about it, that it is impossible for it to make good mortar. This you can test for yourselves by trying it between your fingers. But I should strongly advise you to look with the greatest suspicion on a heap of brownish grey stuff, which the builder will tell you is road sweepings. I am not saying that in country districts where the roads are mended with granite, if the road-siftings lie in heaps for some months and are carefully washed, you may not obtain a very good building material, but as a rule there is much organic matter in roadsweepings, and it is very easy to mix garden loam with it, which is of course, utterly unsuitable for mortar. Another thing that men will often try to use for mortar, especially for a building which is to take the place of one recently pulled down, is the siftings of the old lime mortar and plaster which has come from the debris of the old houses. Sometimes you may spot this unmistakably by the smell, as I myself once did, a heap smelling very strongly of stale smoke from chimneys. As to lime, it is utterly impossible to discuss this question at the far end of what I fear has been a terribly long infliction on you—it would take an evening to itself. I can only say I much wish it were more frequently the practice to build with cement-mortar. I am sure that cement and good sand mixed 5 and 1 would make better mortar than ordinary lime and sand mixed 3 and 1, and the extra cost would not be very great. There is one thing that you should be on your guard against in country districts—never allow any brickwork to be built in chalk-lime mortar. It never sets in the interior of the joints. As to the joints, except in winter, I should always prefer to have the joints struck as the work goes up, rather than raking them out and pointing afterwards. There is always the risk of not raking the joints out far enough, and the chances are that the pointing will not adhere to the mortar in which the bricks are laid. Whether you have a struck joint or a pointed one, insist upon having it cut in at the top of the joint, and not at the bottom. The men will always do this if they are explicitly told to, but if not they will always cut it in at the bottom, why, I have never been able to understand, giving a lip on which the water collects. In hot weather you must be careful to dip the bricks in water before laying them, or they will absorb the water out of the mortar far too quickly, and prevent it setting properly.

And now, gentlemen, one word in conclusion. In this country it can very rarely fall to our lot to be allowed to carry out a commission under these ideal conditions to which Mr. Brydon so humourously alluded last Monday evening in this room, when criticising the students' work at the Institute, *viz.*, where cost is no object. Economy and utilitarianism are the conditions under which much of our work has to be carried out. We must often, therefore, be compelled to give up the use of stone and to fall back on brick. But do not let us on that account despise our material. It is a good honest material, which lends itself to an inexpensive decorative treatment of a perfectly legitimate kind, and I can only hope that in this short paper—the deficiencies of which I am fully conscious of—I may have given you some reasons for not neglecting the study of the history of brick in the past, and I am confident that such a study will be productive of nothing

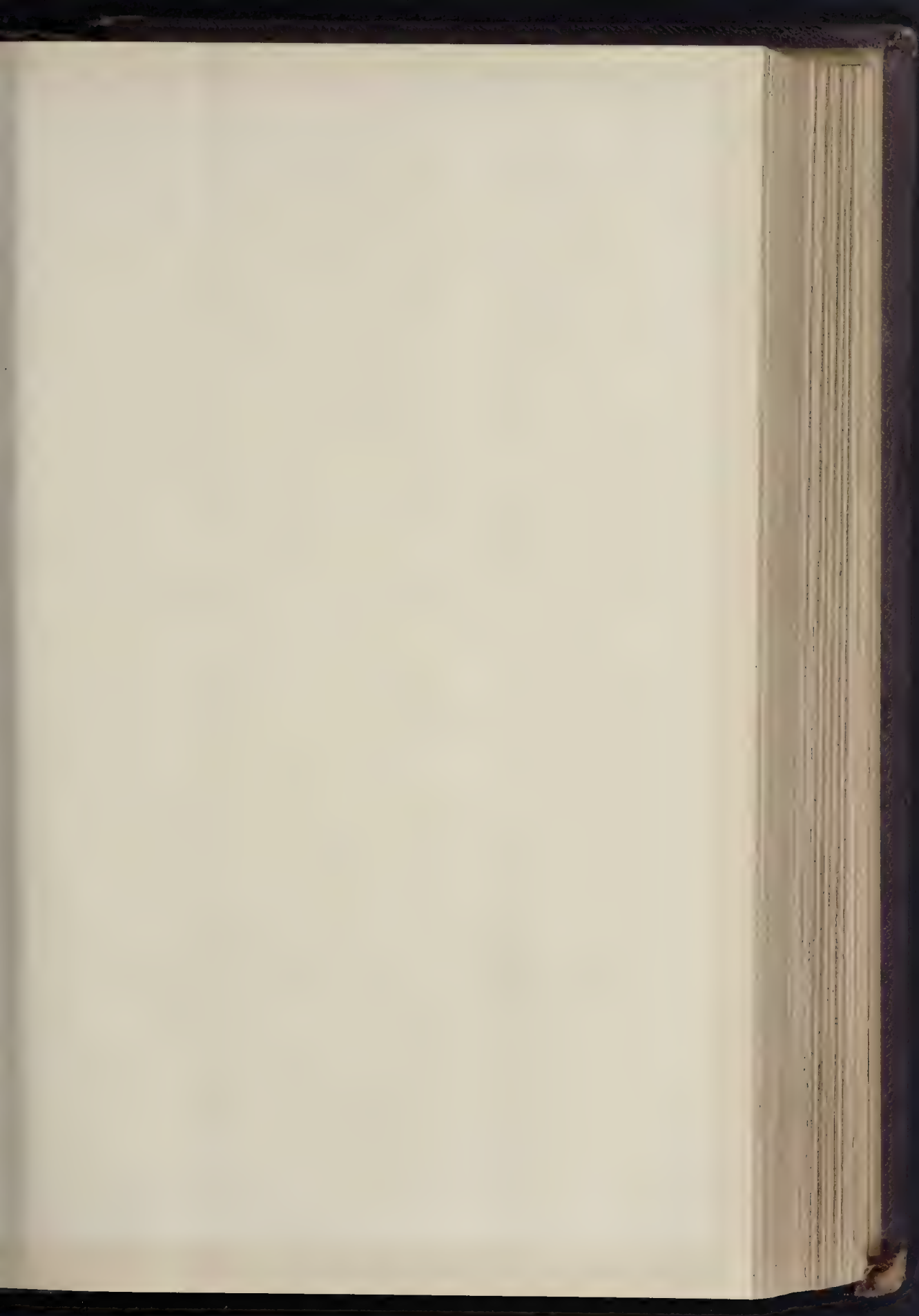
but good in its results on the brick architecture which you will have to construct in the future.

The Chairman, in inviting discussion, called upon Mr. Clement Broad, the senior partner of the firm who had kindly lent the bricks which had been exhibited.

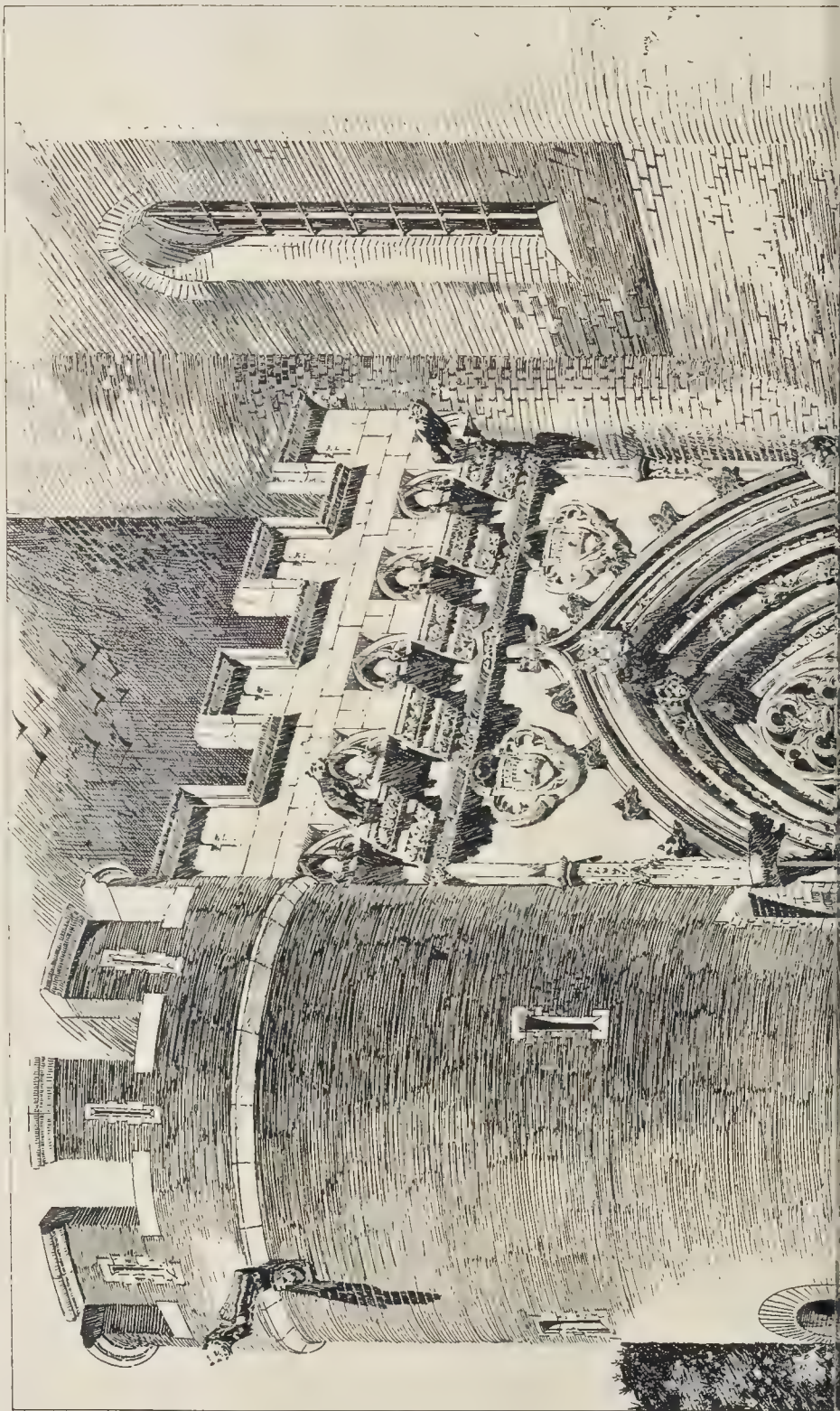
Mr. Broad said brickmakers had very great difficulties sometimes in supplying bricks to meet the requirements of architects, and he found there were some architects who really hardly knew what was a stock brick from a manufacturer's point of view. Stock bricks represented bulk and varied very much; some were soft and other hard, while some were more or less rough. If then, they wanted one particular kind they should specify it. He had seen some builders placed in great difficulty through an architect specifying selected stocks to be used in one part of a building and picked stocks in another part of the same building. The root of all the difficulty was the excessive competition prevailing. The moment a contract was signed a builder had to set to work to get the cheapest thing in the market, which was very natural. He was sometimes asked why he did not make as good bricks as those made one hundred years ago. Well, just as good bricks were made, but with the excessive competition of the present day they could not expect the best article to be commonly used.

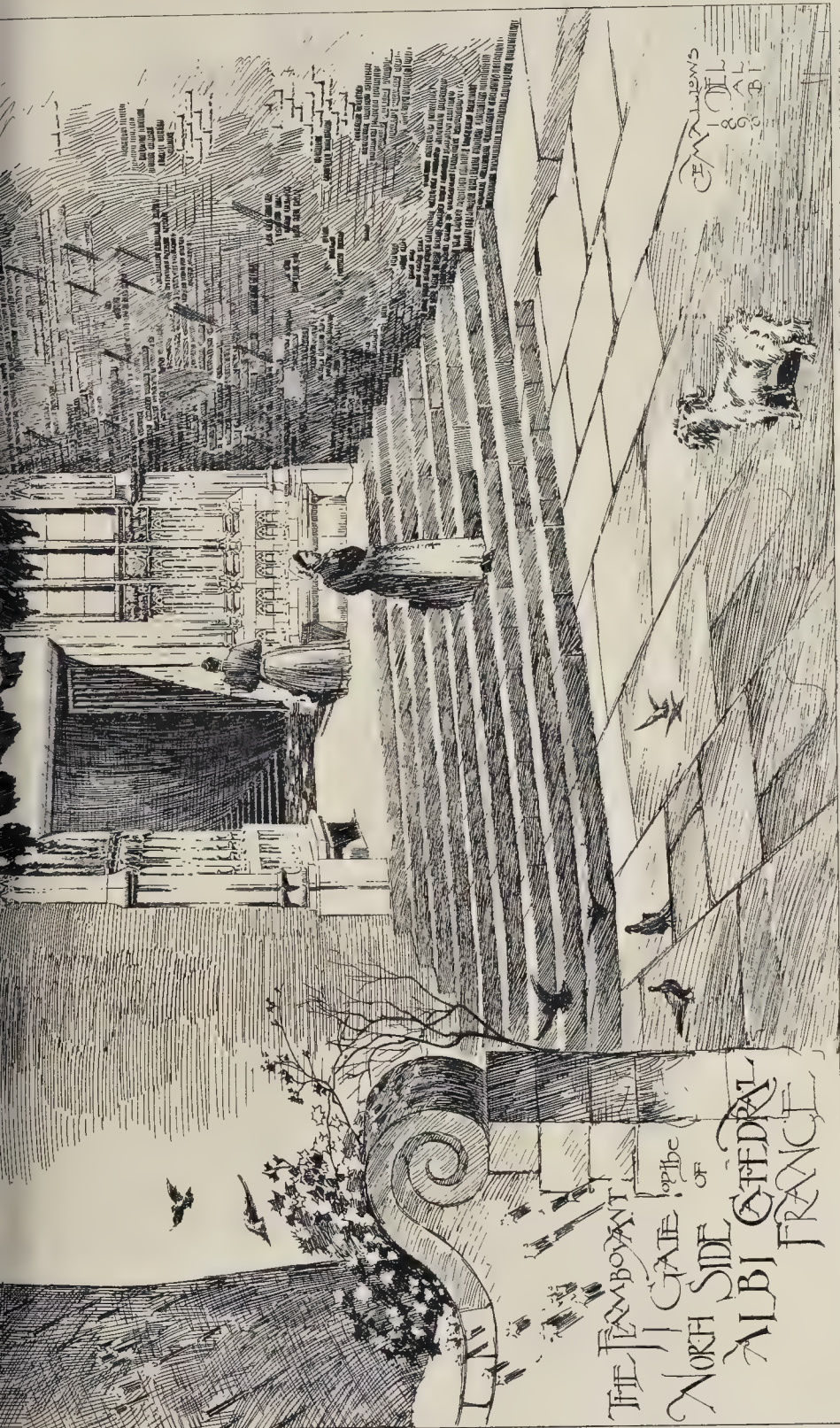
Mr. H. W. Pratt remarked that from both a practical and a historical point of view, Mr. Slater had given them an interesting paper. It was written on for twenty years ago that he was in Verona and other cities in the North of Italy, but he had the most distinct recollection of the beautiful brickwork to which that gentleman had referred. The beautiful forms and detail, and the great preservation of this brickwork through several centuries, had made a marked impression upon his mind. He was in doubt as to some of the brickwork which he saw, whether it was moulded or cut. He fancied it was moulded, but Mr. Slater had referred to some old work which was cut—he presumed he meant cut after it had been placed in position, just as they might cut and carve brickwork nowadays. His recollection of ancient brickwork was that none of it was pointed and built with the fine joints seen nowadays, called, he believed, gauged brickwork. The probability was that if it had been built in that way it would not have lasted till the present day. There was no doubt that the quality of the mortar used in bygones days that had preserved the work. It had struck him that the better the brick that was used for the inside walls of a building, the more distinct was the sound which was conveyed from one apartment to another, and he wished to know why was the best brick for use in internal and party walls, so as to prevent such transmission of sound. His experience coincided with that of the lecturer as to the mortar-joint and the way it should be weathered. Bricklayers who habitually did work Mr. Slater condemned in this direction could give no reason for it, and unless well looked after they were apt to exaggerate the weathering, the consequence being that, although they used a good brick, the work had a bad appearance. Having expressed his agreement with what Mr. Slater said as to the flaking of machine-pressed bricks Mr. Pratt proposed a hearty vote of thanks to the gentleman for his paper.

Mr. F. T. W. Miller said it was not remarkable that the use of bricks in past times in the North of Italy, in Spain, and elsewhere, had resulted in such charming specimens of architecture, but was rather odd that no new characteristic seen to have been developed, and that the old forms had been so generally followed. He thought that in a great measure the charm of the buildings lay as much in the picturesque localities and people, and the beautiful air, as in the buildings themselves, that visitors were influenced unconsciously, and that had the structures been reared in smoky, grubby, England, they might not have been more notable than the rest. It was all very well to go in good brickwork—moulded work, &c.—but he thought was always before his mind when he saw such work that it was very much like a catalogue. He thought there was a dignity, simplicity, and sobriety about the early Georgian brickwork. He wished to ask Mr. Slater whether he knew of experiments having ever been made as to the relative strength of the bricks present made and the larger Roman shapes, merely the crushing strength on the one selected brick, but on the whole bulk of the bricks? It seemed to him that the old shapes would be very much stronger than the modern ones, and that they would better stand the test of time.



THE BUILDER, JANUARY 26, 1895.





Mr. Owen Fleming inquired what became of 30 per cent. of bad bricks. They must be, but to whom? They knew that the weighting power of a wall was very much in excess what was likely to be put on it, and he would refore ask whether it was absolutely necessary use a best stock brick for the interior of walls? He suggested that they might use for this pose some of the bricks which, though not very best hard stocks, were honestly proved. With reference to ornamental work, in opinion it was exceedingly difficult to produce thing that was satisfactory if they once began touch a moulded brick. The best course to ow was to erect their buildings with plain, are masses of brickwork which were honest dignified; he was sure they would make a take if they went into fancy work. He hed to ask Mr. Slater if he had ever seen in market a white brick with about the same ace as the ordinary red. The speaker rred to the difficulties experienced in conning bricks, and suggested that in dealing h builders they should select on the brickfield bricks they wanted used, and then hand it to builder. This was what he had done, and it put an end to much bother. Notwithstanding Lutton brick that had been exhibited, he was ind to say he had some excellent bricks in that part of the country; another good ck was obtained from Crowborough.

Mr. Broad, supplementing his previous remarks, ed that bricks, in making, were divided into ffs, which Mr. Slater had shown did not ring, ce, unburnt bricks used sometimes for build- country cottages; grizzles, to a certain nderburnt, but which, he maintained, ht fairly be used for inside work in London; n came stocks, and afterwards a better ction, including shippers, paviors, mal- mings, and cutters. The 30 per cent. of in- or bricks were used principally by speculative lders. That was the only market for inferior cks. As regarded disintegration, he had been ching lately to find the case of a fair stock ing gone wrong, but he had been unable to over one. But he could point out several ndon buildings where Midland pressed and chine-made bricks were now in a state of dis- gration. In reply to Mr. Fleming, he would tion the Suffolk white brick, which was sand- ed; he believed it was the Grosvenor Hotel, r Victoria Station, which was built with

fr. S. B. Beale wished to know why *shippers*, ch were better bricks than *stocks*, were ays sent out of the country? He understood y were put in ships as ballast. If that were so, ould not stocks or chuffs be sent instead, and better bricks used to make better work? The ing of pressed bricks might be caused by the ansion of moisture in the soft part of the rior of the brick; on the other hand it might ue to the bricks not having been properly d before burning. The ringing test was not lutely conclusive, nor was it always to be d upon. The ring should be taken in junction with the weight, absorption, and ogency. In further remarks the speaker yested that the bricks now exhibited should n the nucleus of a museum of building rials for the Association.

fr. J. C. Stockdale, referring to the size of cks, contended that the most satisfactory ngs were obtained by the use of thin bricks. e Midlands, he said, larger ones were used n in the home counties, and they were very y. Mr. Slater had told them that much of the ern work was unsatisfactory because it was est, but he (Mr. Stockdale) would point out it was a very great point in specifications that work should be neat. He attributed the ing of the machine-made brick to the nging pressure which it received in the process making; to his mind the machine certainly duced an undesirably smooth face, and an ence of that "texture" only found at present hand-made bricks, and which was very ortant. He considered that salt glazed- cks were more satisfactory than a more ensive glazed brick, especially when used for rnal work; they could get a variation in ur in salt-glazed bricks which they could not in others.

fr. Garbutt stated that machine-made bricks e pressed in metal moulds, which, he under- d, were oiled in order that the bricks might ore readily leave them. That caused a skin siderably harder than the interior of the brick, this skin sometimes peeled off.

fr. Goldsmith, dealing with the general treat- nt of brickwork in an elevation, said he agreed

with the speaker who had remarked that he did not think much of the carved work which he saw on buildings round him. In Haarlem, Leyden, and other places in Holland he had seen houses the brickwork of which seemed to him to be almost perfect. There were houses there which had no carving or mouldings whatever, and yet architecturally and artistically the elevations were perfectly satisfactory, and could scarcely be expected to be carried out in any other material than brick. It had been suggested that an archi- tect should select his own sample of bricks on the brickfield. This was an excellent idea, and if they kept such samples in their office and distinctly specified that such were to be used builders would cease sending rotten bricks into the office in the vain hope that in the pressure of business an inferior article would be passed. He had never seen a perfectly-satisfactory white glazed brick, and would like to know if it were possible to keep a glazed brick that, if properly laid, would not crack on the edges or down the surface of the glaze. He also wished to know what Mr. Broad thought of the opalite glazed brick. Having expressed concurrence in the idea of starting a museum of building materials with the bricks exhibited, the speaker suggested that thanks should also be accorded to Mr. Broad for sending the samples.

The Chairman said that Mr. Slater rather objected to rubbed brickwork, but in his opinion, apart from its appearance, which spoke for itself, it was excellent on account of its durability. The best way of pointing besides those mentioned, was, that each brick should be pointed as it was laid, by the trowel. The reason machine-made bricks flaked was because pressure was applied to the outside of the brick, thus forming a skin. If wet got through to the back of the skin, and frost came, the skin came off. Another reason was that the clay was not always properly washed, and lime which had been left swelled, forcing off pieces of the face. In his opinion the best bricks to use to prevent the conveyance of sound were Lindsey's tubular bricks, which were not expensive but were fairly sound-proof.

The vote of thanks having been passed with acclamation,

Mr. Slater, in reply, observed that the question of sound was a difficult one. It was perfectly true that the more solidly they built a house, the more they got the sound penetrating from floor to floor. The damage to machine-made bricks might be done in the drying, but as a matter of fact it was due to the pressing. The clay being partially liquid at the time of the brick being pressed, the outer surface got very hard, and prevented the moisture from coming out during the drying process, flaking being the ultimate result. Flettons were good bricks, but he did not like them for external work. Again, he could not help thinking that an ordinary stock brick was far better for inside work when they were going to put plaster over it, because the surface was not so smooth as in the case of Flettons. He had seen some beautiful specimens of rubbed brickwork which were erected 180 or 190 years ago, but in his paper he was referring to that which had been put up in London within the last few years, and which, he thought, was carrying rubbed brickwork too far. He had Arlsley bricks there, and Mr. Broad had mentioned Suffolk white bricks; the latter, however, he did not like, as they seemed to be too hard and to have too little texture about them when put into house-fronts.

The meeting then terminated.

ARCHITECTURAL ASSOCIATION.—DISCUSSION SECTION.—The fifth meeting of the session of the Discussion Section of the Architectural Association was held on the 23rd inst., at 56, Great Marlborough-street. Mr. H. A. Satchell, A.R.I.B.A., occupied the chair, and a very practical paper on the "Warming and Ventilation of Public Buildings," was read by Mr. R. Henry Weymouth, A.R.I.B.A. The discussion was opened by Mr. Brodie, and sustained by Messrs. Taylor, Stockdale, Simpson, Henderson, Vernon, Dodd, and Clarke. The special Visitor, Mr. J. Osborne Smith, summed up the discussion.

THE COMMISSION OF SEWERS.—On Tuesday the retiring Chairman of the Commission of Sewers, Mr. Alderman Bell, at the ordinary meeting of the Commissioners, enumerated the principal improvements which had been effected in the City of London during his year of office, which included those in Upper Thames-street, Basinghall-street, Widegate-street, Fenchurch-street, and Bloomfield-street. The low rate of mortality in the City proved the good sanitary condition of the City, and in spite of the difficulty of maintaining at the highest standard of cleanliness streets traversed daily by a million pedestrians and 90,000 vehicles, that task had been successfully accomplished.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday, at the County Hall, Spring Gardens, Sir John Hutton, Chairman, presiding.

Dangerous and Neglected Structures Expenses.—The first paragraph of the Building Act Committee was as follows, the recommendations being agreed to:—

"We are advised that it is necessary that the Council should give to Mr. Bevan, of the Comptroller's department, a fresh authority to recover dangerous and neglected structures expenses under the London Building Act, 1894, as the authority given to him, and upon which he has hitherto acted, under the now repealed Building Act of 1855, is no longer of any effect. We recommend—

(a) That Mr. Norman Bevan, of the Comptroller's department, be authorised to sue for and recover on behalf of the Council any sum or sums of money due from or payable by any persons to the Council for expenses and costs incurred by the Council in respect of any dangerous or neglected structure under Part IX. of the London Building Act, 1894.

(b) That the solicitor do prepare a form of authority in accordance with the above resolution, and that the seal of the Council be affixed thereto."

The Teaching of Art.—The Technical Education Board brought up a report in regard to the proceedings of the Board, from which we extract the following in reference to the teaching of art:—

"The most important step taken by the Board in this department has been the appointment of two inspectors of the Art Classes and Schools of Art in receipt of aid from the Board. For this appointment applications were received from 166 candidates, whose claims were considered by the Science, Art, and Technology Sub-Committee. Of these twenty-eight were selected for special consideration, and of these five were invited to meet the sub-committee. Ultimately, on the unanimous recommendation of the sub-committee, the Board appointed Mr. George J. Frampton, A.R.A., and Mr. William Richard Lethaby as joint inspectors at a salary of 300*l.* per annum each, and it was arranged that, in addition to inspecting and reporting upon the various Art Schools and Classes receiving or asking aid from the Board, the inspectors should advise the Board in all matters relating to art teaching, should assist in the conduct of examinations for Art Scholarships and Exhibitions, and in procuring casts and other art objects for the use of the London schools, and, if required, should undertake normal classes for art teachers. Both Mr. Frampton and Mr. Lethaby have for many years been intimately connected with art industries, at several of which they have themselves worked. Mr. Frampton served an apprenticeship as a stonemason, and Mr. Lethaby was for many years first assistant to Mr. Norman Shaw, and is now in professional practice on his own account as an architect and decorative designer. From the Schools of Art and Art Classes which the Board has aided, reports show a great advance during the year, both in the extent and in the character of their work. The application of art to various manufacturing processes is now much more extensively taught than heretofore, whilst the whole work of the schools is becoming more thorough and practical."

The Council adjourned at seven o'clock, after transacting other business of no special importance to our readers.

ARCHITECTURAL SOCIETIES.

NORTHERN ARCHITECTURAL ASSOCIATION.—At a sessional meeting of this Association, held at their meeting-room, Art Gallery, Newcastle, on the 16th inst., Mr. F. W. Rich, of Newcastle, delivered a lecture entitled "The Buildings on the Acropolis, with some notes on the Sculpture." The President of the Association, Mr. Jos. Oswald, F.R.I.B.A., was in the chair. The lecturer was assisted with limelight illustrations by the hon. treasurer, Mr. J. T. Cackett, F.R.I.B.A.

EDINBURGH CORPORATION ART GALLERIES.—Sir John Stirling Maxwell, Bart., of Pollok, delivered a lecture in the Corporation Art Galleries recently on the subject of "Scottish Architecture." The lecture was one of the Corporation art series. The lecturer said that the earliest buildings they had to notice were churches, although they were much less distinctively Scottish than their domestic buildings. The Norman Conquest did not extend to Scotland, but Malcolm Canmore and his successors welcomed Norman and Saxon immigrants in such numbers that this country shared all the advantages of the Conquest without any of its oppressions. This was the great church-building period all over Europe, and Scotland was not behind other countries. Nearly all the Episcopal sees and great religious houses were founded at this time. Holyrood, Melrose,

Kelso, Jedburgh, and many others owed their existence to the generosity of David I. After 1236 there was an architectural hiatus of a century, in which gap the church of St. Monance, in Fife, stood nearly alone. After 1424 a number of Collegiate churches were built; and later on they saw the French influence in such buildings as Trinity College Church in Edinburgh—a church which had been swept away by the North British Railway Company to make room for the Waverley Station. Rosslyn Chapel and St. Giles', with its crown steeple, and one or two Gothic churches were next alluded to, before reference was made to the domestic buildings. The earliest castles they had in Scotland were of the thirteenth century, and Bothwell Castle, Mearns Castle, Rothesay Castle, and Borthwick Castle—the latter with the most majestic fireplace in Scotland—were touched upon and their special features pointed out. Building revived in Scotland under James I., and the Reformation helped to account for the very large number of houses which were built at this time. The castles of this period afforded the commonly-accepted type of Scottish architecture. Maybole was a good example of the so-called "L" plan, and Castle Fraser was an example of the "Z" plan. Fyvie was a later example of the Scottish style, and was the most imposing castle in Scotland still inhabited; but it showed signs of the invading Renaissance. When they looked at Argyll's Lodging in Stirling, built thirty years after Fyvie, the extravagant turrets and corbelling were all gone. The roof and gables had reassorted themselves. This was a beautiful type of a large town house, and was the type which held out the best future for a national architecture in Scotland. Heriot's Hospital gave them some notion of the last strange efflorescence which our architecture made at the time when it fell into the stifling embrace of the Renaissance.

GLASGOW ARCHITECTURAL ASSOCIATION.—At a meeting of the Glasgow Architectural Association, held on Tuesday evening in the rooms of the Philosophical Society, 207, Bath-street (Mr. A. N. Paterson, President, in the chair), Mr. S. Henbest Capper, architect, Edinburgh, delivered his lecture on "The Monks and their Abbeys in Olden Days." On the motion of Mr. William Conner, vice-president, a vote of thanks was cordially given to the lecturer.

ENGINEERING SOCIETIES.

CIVIL AND MECHANICAL ENGINEERS' SOCIETY.—A paper was read at the ordinary meeting of the Civil and Mechanical Engineers' Society, on the 17th inst., by Mr. A. Hanssen, C.E., on "Checking Engineering Calculations." In it he dealt with the necessity of systematically carrying out the work, and the advantage of using mechanical aids, more particularly alluding to the slide-rule, calculating machines, and various forms of planimeters. A discussion ensued, and after the usual vote of thanks to the author, the meeting was adjourned.

INSTITUTION OF CIVIL ENGINEERS: MANCHESTER ASSOCIATION OF STUDENTS.—At a recent meeting of this Association, Mr. R. H. Clayton read a paper on "Mortars and Cements as applied to Structures." It was a matter of regret, the author said, that no concise and thorough information existed as to the classification and locality of good limestones in this country. Methods of distinguishing the nature of limes by their behaviour under certain tests were described, and instances cited where mortar composed of unslacked lime had seriously injured works by forcing masses of masonry entirely off their beds. Specifications of limes, cements, and aggregates for mortars were given, with the results of various tests referring to the same. The qualities of Portland cement were briefly discussed, and the paper concluded with some remarks on the danger arising from the presence of "free lime" in Portland cements.

THE REPORT ON THE NORTHALLERTON RAILWAY ACCIDENT.—In commenting upon the reports on recent railway accidents last week, we inadvertently attributed that upon the Northallerton disaster to Major Narindin, instead of to Major-General Hutchinson, the inquiry being commenced before the retirement of the last-named officer from the post of Board of Trade Inspector. We notice that the Conference of Railway Companies' Signal Superintendents recently presented General Hutchinson with a silver plate in recognition of the courtesy shown by him to the members of their profession, with whom, of course, he frequently came in contact in his official capacity.

ARCHÆOLOGICAL SOCIETIES.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—At the meeting of this Association, held on the 17th inst., the Chairman, Mr. C. H. Compton, J.P. announced that the Council that afternoon had unanimously elected Mr. George Patrick to the office of honorary secretary, as successor to Mr. E. P. Loftus Brock, F.S.A., who recently succeeded Mr. Allan Wyon, F.S.A., in the trusteeship of the Association. The Rev. G. B. Lewis, M.A., exhibited some photographs in further illustration of the very singular double font at Great Toller Church, Dorset, described by him in the current number of the *Journal*. An interesting discussion ensued as to the probable date of the more ancient portion, and the possibility of it having been a Roman altar converted into a font in early Christian days. Mr. Brock, however, pointed out that the font was of Early Norman date, the upper part, of octagonal form, being of the Perpendicular period. Mr. Lewis also exhibited a photograph of a Norman font, discovered some years ago at the bottom of a pond at Whaddon, in Wiltshire, which, on being taken up, was used as the basin of an ornamental fountain in a garden, from which desecration it was rescued by Mr. Lewis, and through his instrumentality was placed in Hilberton Church by the present rector. Mr. Andrew Oliver furnished the following measurements of the font: Extreme outside, 2 ft. 7 in. by 1 ft. 7 in.; inside, 2 ft. by 1 ft. by 4 ft. in height from ground-level. Mr. Oliver also exhibited the upper part of an oak bench-end of the Perpendicular period, having some curious carving, in illustration of the tale of the "Fox and Goose." A description of some recent discoveries on the site of the "White Lion," Bristol, by Dr. Fryer, was read. Mr. W. de Gray Birch, F.S.A., hon. sec., next read a paper "On the Importance of Preserving Welsh MSS.," which evoked considerable discussion.

Illustrations.

GATEWAY, ALBI CATHEDRAL.

THIS gateway is situated at the foot of the external staircase at the south side* of the cathedral of St. Cécile, leading to the flamboyant porch, recently restored by the late M. Abadie.

The porch is probably one of the finest bits of flamboyant work in France, and is far enough south to show a slight influence of Spanish work in detail and general effect.

The effect of the elaborate and delicate detail in dazzling white stone against the severely plain brick of the small round tower on one side, and the main body of the church on the other, seen on a bright sunny day, is wonderful in the extreme, and it gives a picture not easily forgotten. This gateway, with the porch, was erected at the completion of the main fabric in the latter part of the fifteenth and beginning of the sixteenth centuries.

The cathedral itself has a special interest, as being built not only for a church but a fortress as well, and is a fine type of the single-aisled system, with the characteristic planning of the buttresses.

The lower parts of the recesses between the buttresses are occupied by deep windowless chapels, and the upper by long narrow windows, giving, as Ferguson says, a wonderful effect of repose and mysterious gloom.

This character, with its grave simplicity of design throughout, places Albi amongst the finest and most impressive churches in the whole of France.

It took nearly 300 years to build, the foundation being laid in 1282 and the church dedicated in 1476. In plan it is one immense unbroken vault, 55 ft. in width by 262 ft. in length; adding the chapels, 82 ft., its total length is upwards of 300 ft. Internally there is the magnificent choir screen, said to have been erected by a band of travelling German artists; it undoubtedly shows German influence everywhere, with its marvellous and intricate detail and carving.

C. E. MALLOWS.

DESIGN FOR MUNICIPAL BUILDINGS, ST. PANCRAS.

THIS design, illustrated in an admirable drawing, was one of the best, in point of exterior architectural treatment at all events, among the numerous designs of very unequal interest which

* The word "north" on the drawing was, we presume, a slip on Mr. Mallow's part while completing the drawing. Ed.

were sent in competition for the St. Pancras Municipal buildings two years ago, when the £1 premium was given to a design of much more commonplace architectural character, though some respects of more suitable plan. The design was sent in by Mr. F. H. Tulloch and Mr. Langton Dennis in co-operation.

PALAZZO NOTARI, VENTIMIGLIA, ITALY.

THIS block of building, the drawing of which was exhibited at the Royal Academy last year, was designed to suit the simple requirements of the native population, and is now in course of construction by native methods. The plan and design are by Mr. W. D. Caroe. Owing to recent illness and subsequent absence from town, Mr. Caroe has been unable to give us a detail plan or any further information in regard to building at present.

SMALL HOUSE, BRENTWOOD.

THIS plan and design for a small country house, which has not yet been carried out, is by Mr. E. A. Hill, and was exhibited at the last Royal Academy. We commented on it reviewing the architectural drawings at the Academy, and called attention to the graceful treatment of the circular vestibule.

ITTON COURT, MONMOUTHSHIRE.

A VIEW of another portion of this house, given in the *Builder*, May 20, 1893, along with the plan, and some description of the work done in extensive additions to the old buildings, which are of various dates, the only portions of original building left being, as was then stated, the tower, which was shown in the drawing published. The drawing given in this number, which was exhibited at the Royal Academy last year, shows a portion of the courtyard from another point of view. Mr. E. Guy Dawber is the architect.

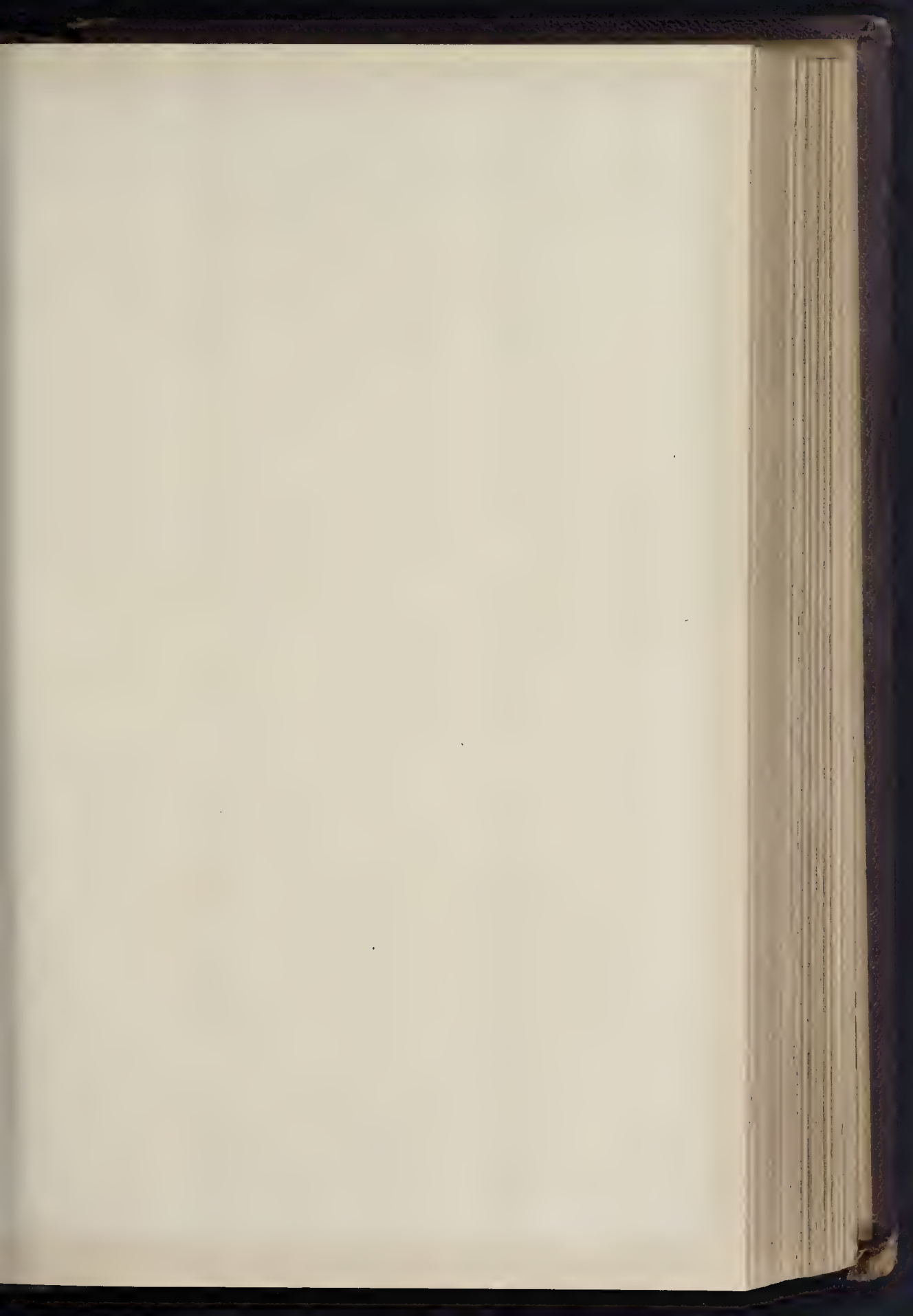
LYCH GATE, MONMOUTHSHIRE.

THIS gate was erected some two years ago. The framing is of English oak, with split shingle roof. The architect was Mr. E. C. Dawber, of London.

ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.

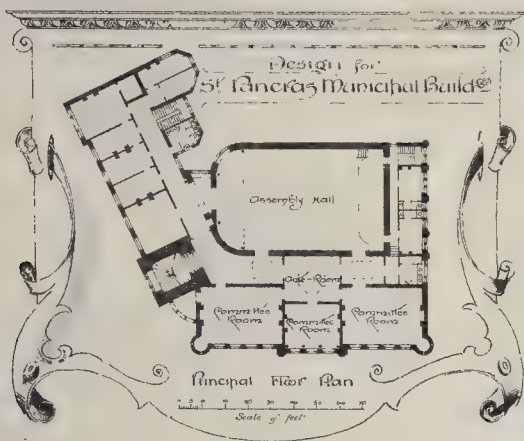
A METROPOLITAN district meeting of members of the Incorporated Association of Municipal and County Engineers was held in the Lecture-room of the Institution of Civil Engineers, Westminster, on the 18th inst., to consider the subject of combined drainage and public sewers. Considerable interest is felt in this question by Municipal Engineers by reason of the recent decisions of the Courts in the Halifax and Lower Arcade cases. Papers dealing with the question were read by Mr. W. Nisbet Blair, A.M.Inst.C.E., Surveyor to the St. Pancras Vestry, and Mr. R. Godfrey, A.M.Inst.C.E., Surveyor to the King's Norton Rural District Council. Mr. A. M. Fowler, C.E., Manchester, occupied the chair.

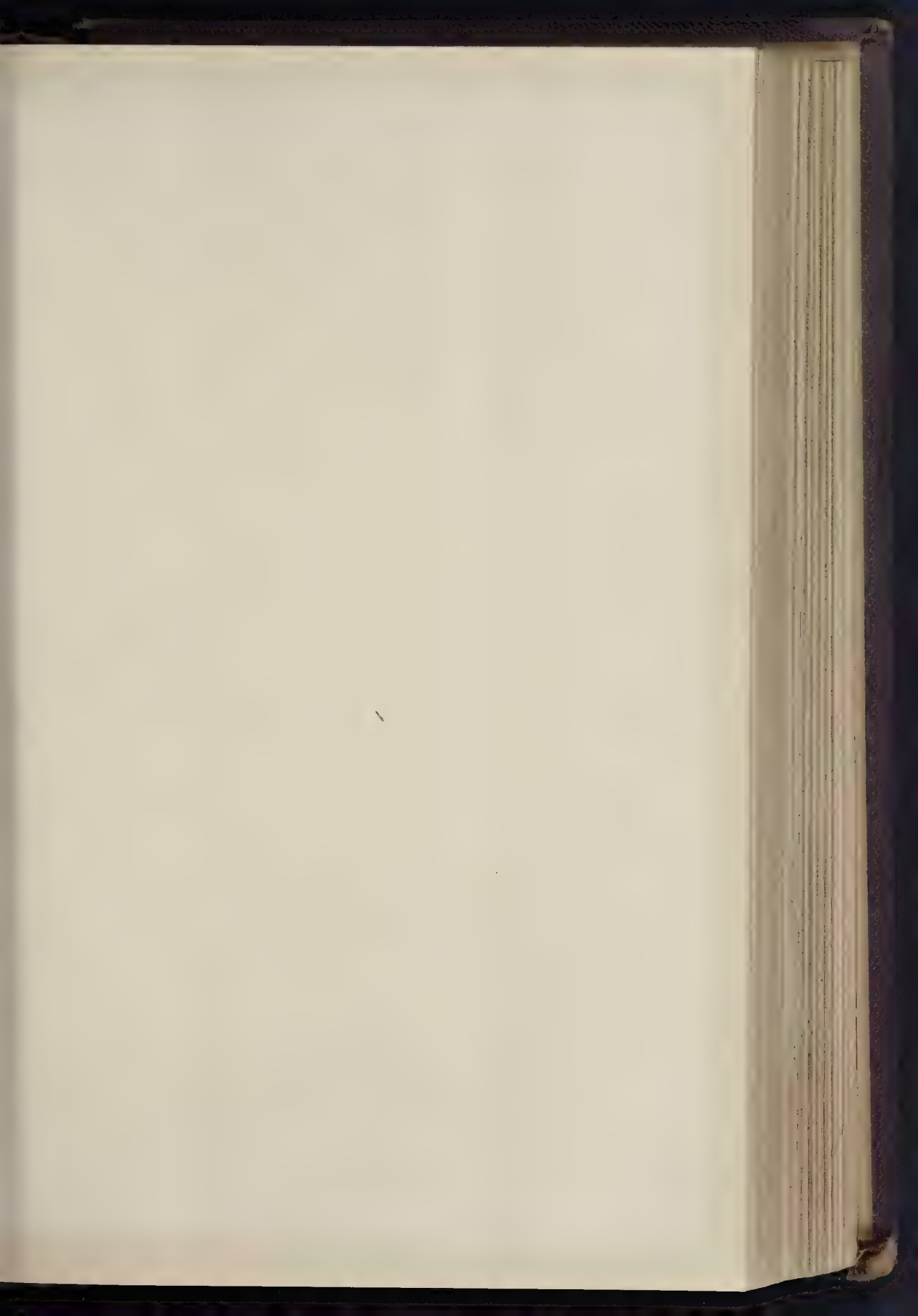
Mr. W. Nisbet Blair first read a paper on "Private Drains or Public Sewers." He said that probably the majority of them had cases in which a decision had been given which inflicted upon the ratepayers a most serious burden, and which they could only regard as a most inequitable and not iniquitous, charge upon the public rates. The practical opinion of engineers and surveyors on this matter went for little when it was opposed by legal decisions, and doubtless they were agreed that it was eminently desirable that an alteration should be made in the law which would render no longer possible to repeat the decisions given in similar cases to those which had been before the Courts during the last few years. There appeared to be a difficulty as to how Parliament should be approached to bring about this change in legislation. The simplest means, so far as regards London, would be for the London County Council to bring in a Bill embodying satisfactory clauses, but, unfortunately, the Council has been approached by the Local Authorities of London, was advised not to proceed with this matter. The clauses in the Metropolitan Management Acts of 1855 and 1862, which distinguished between a drain and a sewer, decided that a combined drain to remain the property and at the liability of the owner must be under the order of the Vestry or District Board, and it had always been held that the burden





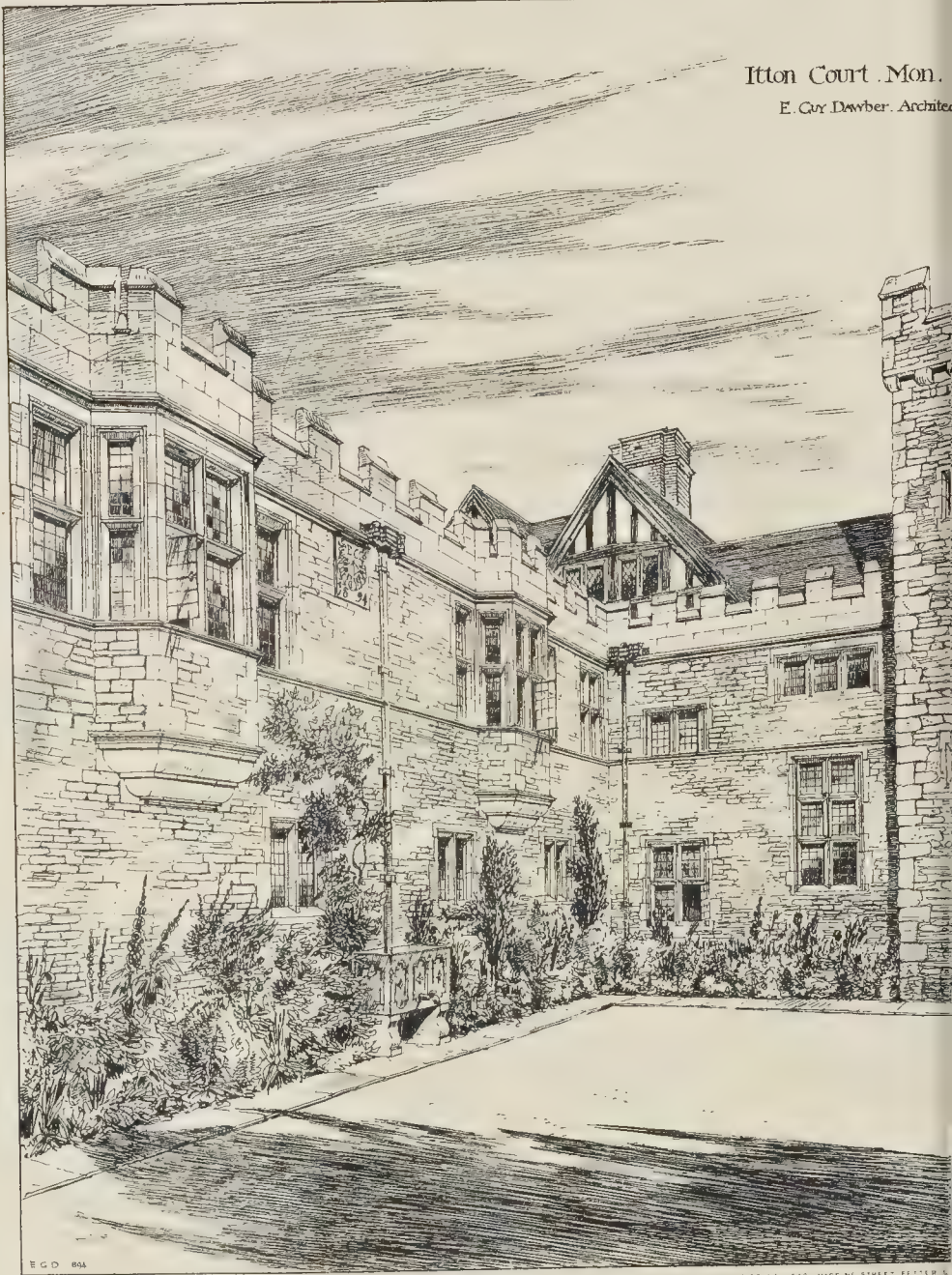
COMPETITION DESIGN FOR ST. PANCRAS M





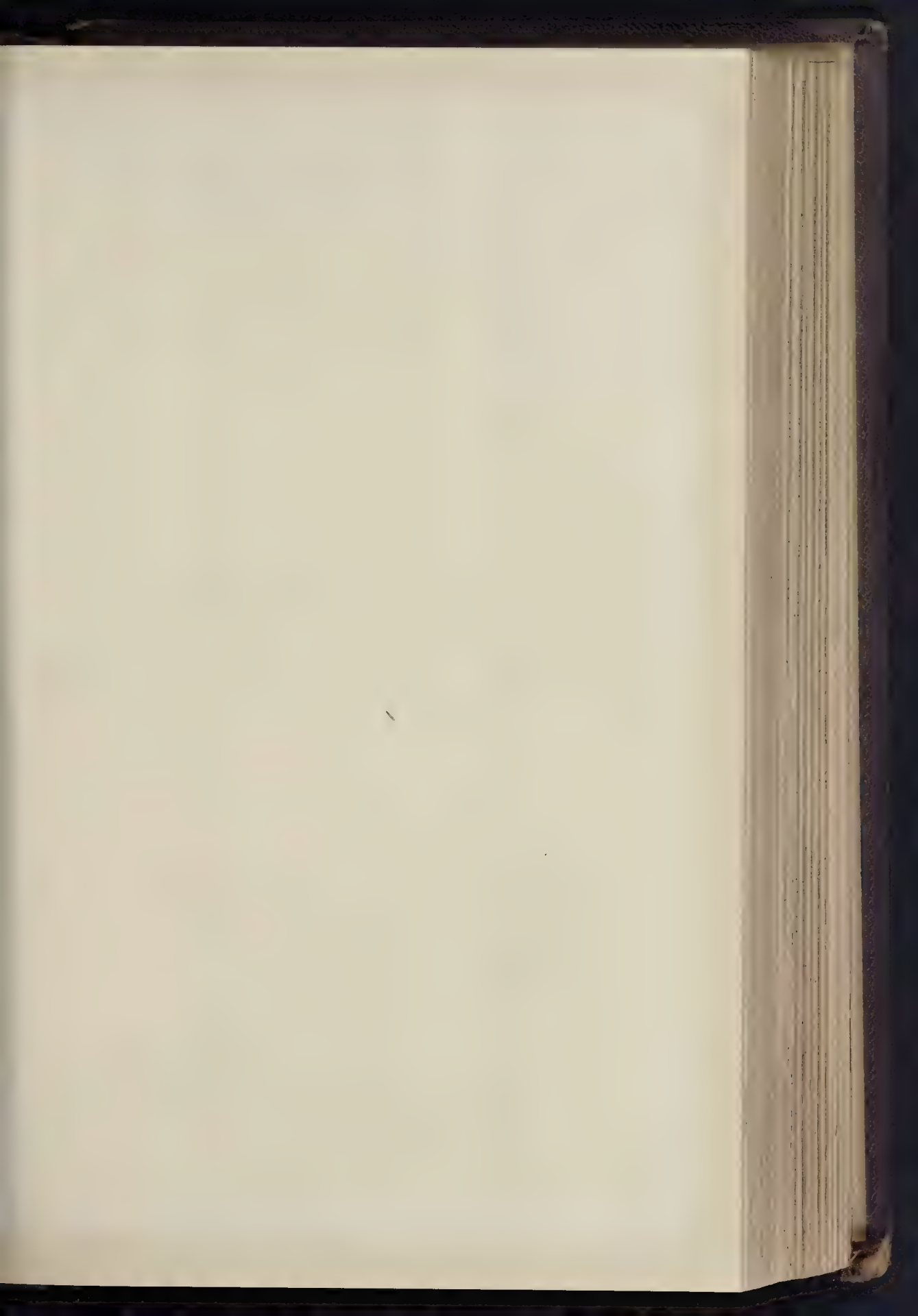
Itton Court Mon.

E. Guy Dawber. Architect.



A Lych Gate, Monmouthshire
E. Guy Dawber, Architect







Small House at Brentwood.

MR E. A. HILL A.R.I.B.A. Archt

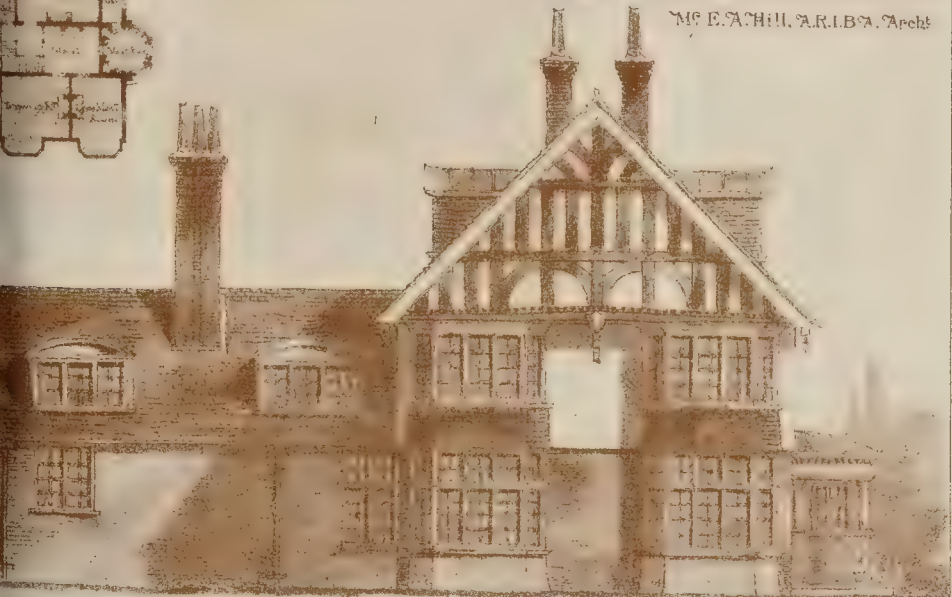


Front Elevation



Small House at Brentwood.

MR E. A. HILL, A.R.I.B.S.A., Architect



Side Elevation

proof as to this approval or order rested with the local authority, so that any combined drain made without notice being given to the Local Authority, or without the submission of any plan—or, in fact, surreptitiously and illegally—became, by virtue of the very illegality of its construction, a sewer, and as such chargeable upon the public rates. From his experience in the case of *Pancras* he had no doubt there were many thousands of such cases in London. An illustration of a case of this kind was that of Moss and the *Pancras Vestry*, which came before one of the Metropolitan Courts in October last. The *Vestry's* contention was that the pipe passing through the house from the main sewer was a drain, as, though no approval could be traced by the connexion of the two pipes from the adjoining house, it was contended that the connexion was made surreptitiously, and that such an act should not render the *Vestry* liable to maintain the pipe passing through the house as a public sewer; but as the burden of proof was on the *Vestry* to show that it did not give its sanction to the laying of the drains, and having failed in that, the summons was dismissed. After citing various cases of combined drainage, Mr. Blair did there was another upon which difference of opinion exists. A branch from a main sewer might receive the drainage from property in more than one occupation, and was consequently a sewer; but a certain distance along its course a junction existed above which the drainage was a drain. The question was: were either of the drains to be regarded as sewers? He contended that each was a drain, whereas he was aware that a solicitor had advised that both were sewers. If so, then every soil-pipe which might become connected to a combined drain became a sewer, though passing vertically through a private house. The report of the law officers of the London County Council would afford some interesting study. Those reports suggested that the difficulty in which Local Authorities were placed was due either to their own imperfect comprehension of the law as to drains and sewers, or that their difficulty was due to their own laxity of supervision or neglect in keeping records of combined drains sanctioned by them. There were few who really understood the present difficulties: who would not agree that the responsibility suggested as resting upon the Local Authorities or their officers for laxity of supervision or system was the cause of the present position of things.

Mr. R. Godfrey then read a paper entitled "Notes on Combined Drainage." He said that under the Metropolitan Management Act, Sec. 250, combined drainage was authorised "with permission," and therefore in the future all combined drains could be kept from becoming sewers; but in the Public Health Act, 1875, amended in 1890, there was no provision of that kind, and therefore the interpretation of the words, as focussed by the case *Travis v. Utley*, had a far more serious effect on provincial districts than on Metropolitan Vestries. It appeared to him (Mr. Godfrey) that the cause of the trouble had arisen from a too cursory reading of the definition of the word drain in Sec. 4 of the Public Health Act. "Drain means any drain of and used for the drainage of the building only," or "premises within the same curtilage." The rock on which they had come to grief was the word "curtilage." From the definitions of the word it was clear that the proper use of the word curtilage was that adopted by the Judges, and that its application to the boundary of a property containing more than one dwelling was not warranted by the derivations and meaning of the word. The draughtsman of Section 250 of the Metropolitan Management Act seemed to have grasped the position better and provided for the combination of curtilages by permitting a "combined operation under the order of any Vestry or District Board." In the case of the provinces there was no corresponding power given by the Public Health Act, 1875, and Mr. Justice Kay was perfectly right when he said, in the case of the *Acton Local Board v. Batten*, "a drain is a sewer as soon as more than one house has been connected with it." They were thus placed in the position that they must either insist upon every house having a separate drain, no matter what cost to the owner, or they must accept a drain draining two or more houses as a sewer—a condition of things of which they could not gauge the potentialities. Mr. Godfrey had the exhibited diagrams of the property in the *Halifax* case, and in that of the *South Arcade* he said that accepting the facts of the courts until the Public Health Act was

amended so as to sanction a combined operation, the only course open to provincial authorities was to insist upon every house having a separate drain. This course had been adopted at Cardiff, West Bromwich, and by the Kings Norton Rural District Council, while Reading, in its local Act, had obtained the necessary power to order and sanction combined operations. The adoption of this course would lead to some curious networks of drains, especially in the case of terraces of small houses. The light which legal luminaries had cast upon this subject exposed another serious aspect of the case. If the local authority was to be responsible for and maintain a sewer from the main sewer to the inspection chamber, did it not become the duty of the local authority to provide for and lay down that sewer? As the subject was one exercising the minds of all municipal engineers, who were practically unanimous in the view that some alteration in the law was necessary, the Association should, in the interests of the country, generally take the lead in an endeavour to bring such pressure to bear on the Local Government Board as would bring about a speedy revision of the definitions of drain and sewer, and so to relieve the already overburdened ratepayer of an enormous charge which rightly belongs to the property-owner. The lines on which amendments should follow were the sanctioning of "combined operations" and "power to prevent any alterations of drains without notice."

Mr. Lewis Angell, West Ham, said that on the general question of private drains and public sewers they were all agreed. The question was—how is the law to be altered? In West Ham 250 miles of sewers had been put under the control of the Corporation which were simply private drains. For forty-five years combined drainage had been allowed until the whole thing had been upset by a legal decision, and the Local Authority were charged with the duty of clearing the drains of scrubbing-brushes and fannels which found their way there by the carelessness of tenants. He did not think they, as an Association, could do anything in the matter, except to work up their various authorities, Town Councils and Local Boards to take action. He did not think they could approach the Local Government Board; it was a matter of policy and of law, one for the Town Councils and Local Boards, and not for themselves. This he felt so long ago that he moved in his own Council at the beginning of last year, and they sent a very strong representation to the Local Government Board in April. They received an official answer that it should receive attention, and that was all they got. On June 30, he brought the matter again before his Council, and the town clerk was again directed to communicate with the Local Government Board, but they had got nothing more yet. In consequence of this, the letter of the town clerk and a memorandum and document of his (Mr. Angell's), was sent round to 1,100 Corporations and Local Boards; and they received many replies offering to co-operate with West Ham in obtaining an alteration of the law. Then beyond that, the Associations of Municipal Corporations had prepared a Bill to bring in next Session to obtain an alteration of the law. Therefore, he was inclined to think that if they made any representations at all, it should be to the Association of Municipal Corporations.

Mr. H. Percy Boulnois, Liverpool, said he agreed with Mr. Angell that the right body to deal with this question was the Association of Municipal Corporations.

Mr. W. Weaver (Kensington) thought the Metropolitan must be taken as distinct from the country at large on this question. The drainage throughout the country had been done in accordance with certain model by-laws framed by the Local Government Board, and therefore the proper power from which to obtain an amendment of the law would be the Local Government Board. But in London the County Council was the authority which controlled this with a multitude of other matters. The Council had been approached, and advised not to proceed with the matter. If this decision of the Courts was allowed to stand, he had no hesitation in saying that 100,000l. would be transferred from the pockets of the Local Authority to that of private owners of property. How was the law to be altered? The surveyors of London had a meeting some time ago, when they debated the matter at some length, and arrived at certain conclusions, which had been transmitted to the Council for consideration. The view taken at that meeting was that a drain should be considered a drain until it was proved to be a sewer, and that the onus of proof ought to lie on the property-owner; and that it

ought not to lie on the Local Authority to prove that a combined drain was a combined drain and not a sewer, which was beyond the power of the Local Authority to prove, owing to surreptitious drainage in the past. There was a deputation about to go before the County Council—three from each Authority—to seek such an amendment of the law as would remove the absurdity that a pipe which received the drainage of more than one house was a sewer. He thought it would strengthen that deputation if a resolution was arrived at by that meeting advising that certain steps should be taken. It would strengthen the hands of the deputation if it were known at the London County Council that the officers charged with the execution of the work throughout the Metropolis were convinced that if the law remained unaltered, a vast amount of expense would have to be incurred by the Local Authority which ought to be properly borne by private owners of property.

Mr. J. P. Norrington, Lambeth, said that as a Metropolitan surveyor he wished to endorse Mr. Weaver's remarks. He felt that a great deal of inconvenience and expense would fall upon local bodies from the absurd definition of the law which had recently been given by the Judges. He had recently to reconstruct what was called a sewer under old property, which it would have been more proper to condemn as dangerous. The result of having to relay this drain was, that he had to do all the shoring to keep the building up. He left the building safe, but he did not know what might result hereafter. He had had a curious case in his district, showing how a drain might become a sewer. A person submitted the drainage for four houses, each of which was to be drained into the sewers. The plan was approved. The man went away, changed his mind, and drained the houses by a combined operation. The question was whether that would not be a public sewer?

Mr. J. T. Eayrs, West Bromwich, said that some members might go away with the impression from Mr. Godfrey's paper that they insisted upon a drain for every house connected direct with the sewer in the street. The drainage of each house was brought to the side passage, at the head of which a manhole was constructed, and the drainage of each house was connected separately. They acknowledged the drain at the end of the passage up to which all the drains converged as a public sewer.

Mr. T. Walker, Croydon, said that after draining 400 sets of houses into inspection chambers he found there was no difficulty, and no considerable expense thrown upon the builder or the rates. He could not remember an instance where anything had gone wrong. They did not, however, think that the maintenance of these back sewers ought to fall upon them, and they were going to ask to be relieved of them.

Mr. A. D. Greatorex, Sutton, Surrey, said that three years ago his district, which has 3,000 houses, had no drainage at all, and the Board had spent 55,000l. in laying down a system of sewers. During the last eighteen months, 1,500 houses had been connected with the sewers, and the system generally adopted was similar to that introduced by Mr. Walker, and in other cases there was a back drain into which all the small houses connected. In a few years they would have miles of these drains at the backs of the houses, which would become public sewers unless the law was altered.

Mr. R. M. Gloyne, Eastbourne, read a draft of the new Bill prepared by the Association of Municipal Corporations to amend the law, and which proposes to make all combined operations private drains, and to give widened powers of entry and examination for officers of local authorities.

Mr. C. H. Cooper said that in his own district there were long lengths of back drainage belonging to different owners, and if notices were served on them to put their own particular part of the drainage right, it was almost impossible for them to do so, as the work ought to be done together, and would be much better done by the Local Authority than by the several owners. In the case of new houses there was no difficulty.

Mr. Worrell, Chief Works Inspector for St. Pancras, said they were all agreed that the remedy for the present position of affairs was Parliamentary interference.

Dr. Sykes contended that from the time these Acts were passed the pipe which carried the sewage of more than one house had been a public sewer. There was a decision as long ago as 1862. It might be very convenient for engineers for administrative purposes to have this arrangement,

but if the public had been building on certain lines he thought it would be unjust to make any Act retrospective and punish them for doing what they were entitled to do.

Mr. Blair and Mr. Godfrey briefly replied to the discussion, and on the motion of Mr. Angell, seconded by Mr. Weaver, it was agreed that a resolution embodying the views of the meeting should be forwarded to the Conference of delegates from the Vestries and District Boards of the Metropolis, held at the Holborn Town Hall, on Monday, the 21st inst., and that copies of the resolution be also forwarded to the London County Council and the Association of Municipal Corporations. The drafting of the resolution was remitted to the Council of the Association.

On the motion of the President votes of thanks were also accorded to the authors for their papers and to the Institution of Civil Engineers for the use of the meeting-room.

Correspondence.

To the Editor of THE BUILDER.

THE NEW DISTRICT COUNCILS AND THE PUBLIC HEALTH ACT.

SIR,—Your Note in the *Builder* of January 19 raises questions which can, I think, be best answered by the aid of the plan of the building which has, as I still venture to think, been illegally sanctioned by the Local Authority at Wimbledon.

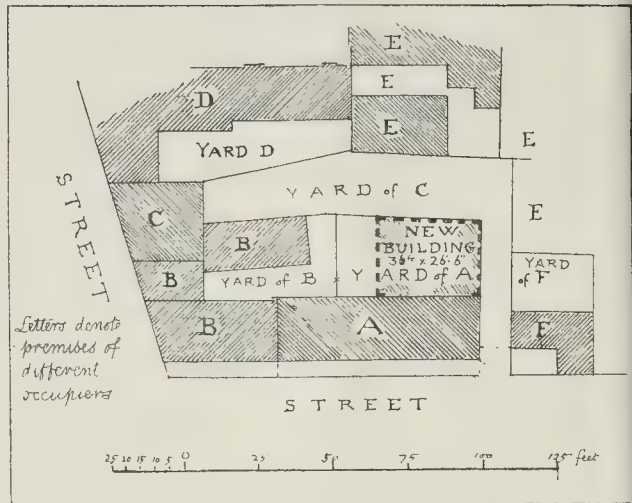
The letters (see plan) A B C D E F distinguish premises of different occupiers. A is an old building, once a range of stabling and coach-houses, built long before Local Boards or Public Health Acts were thought of, and converted some time back into a dwelling-house. It had till a few months ago a sufficiently spacious back-yard, extending behind its whole width. The greater part of this yard has now been covered by the building shown by a dotted line covering nearly 1,000 superficial feet, and containing nearly 16,000 cubic feet. It is further in contemplation to add an upper story to it.

The point at issue is simply this—is this new building exempt from the operation of the by-laws on the ground that it is attached to an old building which is itself exempt? Or is it a "new building" in the sense intended by the Public Health Act, and therefore erected in violation of the by-laws?

It is admitted on all sides that if it is a "new building" in the legal sense, it has been improperly passed by the Local Authority; but that Authority has refused to interfere on the ground that they have no control over additions to old buildings. According to the statement of the Clerk of the Wimbledon Board in his letter to the *Times*, Local Authorities, except in London and towns with a special Act of Parliament, have no power over additions to buildings older than 1858. The owner of a building thirty-seven years old may make any rickety, inflammable addition to it he pleases with impunity, although it is surrounded by other buildings a few yards distant, and he may disregard all considerations of open space for light and air. At least he may do so at Wimbledon, and now that this is officially stated no doubt it will be done there very freely.

But the Clerk of the Wimbledon Board himself admits that when an addition passes a certain limit it ceases to be an addition, and becomes a new building. What that limit is he declines to say. Each case must be determined by the Local Authority on the facts. So that, after all, we come to this—that it rests with the Board to interfere or not pretty much as it pleases. One Board may reckon any addition, larger than a pantry or a porch, as a new building, and require it to obey the by-laws; another may, as in the present case at Wimbledon, refuse to interfere with the intrusion into a crowded back-yard of a building covering more than half as much ground as the old building to which it is adjacent. Surely if the Board are to do as they please in enforcing the by-laws or not there is an end of their plea that they are powerless to interfere.

But the strangest part of their Clerk's story is his explanation of the fact that though the building was exempt from their jurisdiction the Board received the plans and passed them. We are told that the plans were submitted as a voluntary act by the applicant, and what is more wonderful, that such voluntary acts are not uncommon. That any sane person should voluntarily submit



his work to the approval of a Board which has no authority to interfere, and incur fees and tedious formalities from which he is exempt, almost passes belief. Nor do the reasons for this self-sacrifice which he gives in his letter to the *Times*, explain it in the present case. The applicant in question has no need to "ascertain the views of the Local Authority," for he was himself chairman of the Board, and knew as well as them how far the by-laws applied; nor is it likely that, being a builder, he was "glad to get an expert opinion gratuitously."

Your correspondent, Mr. Gibbs, observes what must have struck anyone conversant with the matter, that the Public Health Act seems to avoid defining a "new building." It is much to be desired that the definition he quotes from the Sheffield Corporation Act were generally accepted, and made binding upon Local Authorities throughout the country.

But even then there would still be wanting some ready form of appeal, short of the expense of litigation in a superior court, to force a Local Authority to act by its own rules. Mr. Sewell, in a letter to the *Times* of January 21, tells us how the Reigate Board ignores its own excellent by-laws, and has allowed the construction of a street which violates them, in spite of the protests of the ratepayers. He concludes: "When by-laws necessary for the safety of the public and the protection of the poor are knowingly set aside by Local Authorities, it can only be because the interests of a small class, perhaps owners of a certain kind of house property, are preferred to the advantages of the whole community."

T. G. JACKSON.

* * A letter on the same subject, from "A Town Surveyor," is held over for want of space.—E.N.

The Student's Column.

BRICKS AND TERRA-COTTA.—IV.

EARLY HISTORY OF BRICKMAKING.

THE moulding of clay, and the application of the heat of the sun to harden the object moulded, were almost the earliest arts of which we have any record or relic; sun-dried bricks are in common use in certain parts of Asia, even at the present time. From this elementary product to a more finished article burnt artificially was but a slight step, so we must not be surprised to learn that both sun-dried and fire-burnt bricks were made by the most ancient nations of which we have any real knowledge. We are distinctly told in Genesis xi., 3, 4, that burnt bricks were made for the erection of the Tower of Babel; that the builders "had brick for stone, and slime had they for mortar." The Chaldeans and Assyrians were acquainted with both kinds of brick, and well understood the firing of clay for terra-cotta. Bricks from ancient Babylon vary in form, size, and colour, some being of long proportions, about a foot in length, and 3 in. to 4 in.

thick, others about 1 ft. 6 in. square and of similar thickness; their hues are not unlike of modern red and yellow products. In speaking of the manufacture of these ancient bricks, Herodotus explains how the earth was taken out of a moat and as the labourers dug this they made bricks in the earth. When they had moulded a sufficient number they baked them in kilns.

Xenophon, in his "Anabasis," Book ii., cap. 1, gives an account of the wall of the Medes. Was built, says he, of burnt bricks laid in asphalt (bitumen), 20 ft. in thickness, 100 ft. high, whilst its length was about 67 miles.

The use of bricks painted in colours, burnt in was proved by the discoveries of Layard and others at Nimroud, where specimens were found enamelled in white, yellow, and green. They were apparently embedded in plaster above some alabaster slabs, and were no doubt intended for ornamental purposes.

The Egyptians were well-versed in the art of brickmaking, but many ages elapsed ere they began to use burnt bricks. The use of this material for their buildings was largely dictated by necessity, there being practically no timber in the country fit for building purposes. When the Jews were in Egypt, brickmaking had attained to a very high degree of proficiency. Stubble was used with the silty mud of the Nile in the manufacture of the material, which was burnt and used in many public works. In a monument of the XVIIIth Dynasty we have a representation of the whole process of brickmaking. It was carried out on almost precisely the same lines as with at the present day, with the exception of firing. The mixing of the clay, the fetching water in a bucket from a pond, the moulding in a wooden mould (with a fixed head wider than the mould itself), the carrying of the bricks suspended by sort of yoke, and the setting them in order to be depicted in an unmistakable manner. In Egypt there are many small pyramids of unbaked bricks, the latter being formed of loam and chopped straw.

The Greeks made at least three sizes of brick which have been well described by Vitruvius: these were the *didoron*, 6 in. in length; the *teladoron*, 12 in. long; and the *pentadoron*, 15 in. long. The two last were square, the first elongated. To each of these they made bricks, which gave them the choice of a great variety of thicknesses for their walls than it would otherwise have had. The same writer states that the Greeks used the *pentadoron* for public and the *teladoron* for private works; as to the application of the *didoron* he is silent, he also is respecting the thicknesses of bricks. He instances several celebrated structures as the walls of Athens, the cells of the temples of Jupiter and Hercules, which were of brick, surrounded columns and entablature being of stone. Nevertheless, it does not appear that the Greeks were great users of bricks, at least, prior to the Roman conquest.

The Romans, however, employed this material very extensively. In his researches amongst the buildings of ancient Rome De Quincy observed

the found bricks of three sizes:—(1) $7\frac{1}{2}$ in. by $1\frac{1}{2}$ in. thick; (2) $10\frac{1}{2}$ in. square and 18 to 20 lines in thickness; (3) 22 in. square to 22 lines in thickness. The smaller bricks made to face walls of rubble work; and to a better bond with the wall, they were cut into two triangles, the longer side being out on the outside, and the point towards the core—the work being bonded by courses of large square bricks at every 4 ft. in height. Large bricks were also used in arches of open or discharge, which were necessary in the wing. According to Alberti's observations, Romans had in some of their buildings, particularly in arch-work, bricks 2 ft. square; and a kind used in pavements and borders, were about 6 in. by 3 in. and 1 in. thick. Palladio's time bricks were termed *quadrati*, with regard to their sizes, he says that they may be larger or smaller, according to the use of the purpose for which they were intended. Some writers state that there was a kind called *tavella*, 7 in. by $3\frac{1}{2}$ in.; and that the Romans also had a sort called *bipeda*, two Roman in length.

Examples of Roman bricks in England, the wing dimensions of some found at Newcastle—may be given:—

Roman Bricks at Newcastle.

1.— $6\frac{1}{2}$ in. \times $3\frac{1}{2}$ in. \times $1\frac{1}{2}$ in.
2.—8 " \times 4 " \times $1\frac{1}{2}$ "
3.—7 " \times 6 " \times 2 " (and $1\frac{1}{2}$ in.)
4.— $7\frac{1}{2}$ " \times 8 " \times $1\frac{1}{2}$ "
5.— $10\frac{1}{2}$ " \times $10\frac{1}{2}$ " \times $1\frac{1}{2}$ "
We have abundant evidence of the use of hollow bricks by the ancients; one such, of Roman age, found near the above, measured 11 in. \times 7 in. \times 1 in., the material being three-quarters of an inch in thickness. These hollow bricks were made on block moulds, and were employed, amongst other things, as channels for hot air for stoves and baths, though they have been sometimes used for purely constructional purposes. At a Romano-British villa there were found a wall formed of bricks about 7 in. square; a pavement, bordered by three rows of black and red tiles, 6 in. square, laid chequerwise, bounded next the wall by a row of bricks in. by 11 in. and 2 piers 2 ft. 9 in. in height, $7\frac{1}{2}$ in. square, consisting of eighteen layers of bricks, with a larger one, $10\frac{1}{2}$ in. square at top bottom. From the foregoing it is evident that considerable latitude was allowed in the size of Roman bricks, though it should be forgotten that these bricks refer to several different periods.

It is interesting to learn the way in which the Romans prepared the raw earths and burnt them. Brickmaking had acquired great importance in the days of Vitruvius, and it is but natural that he should have paid some attention to the subject. He gives the following directions for firing unbaked bricks. They should not be made of sandy, stony, or gravelly loam, for a kind of earth renders them heavy, and upon being wetted with rain after being laid in a wall they sweat and adhere, and the straw put in does not dissolve on account of their roughness. The earth of which they are formed should be light, chalky, white, or red; they may possess small amount of grit or sand, as these are pliable to unite well, and being light, are handled with facility in building. They should not be made in summer, because when dried in the intense heat of that season, they are parched externally, whilst the interior is still rather wet. They ought, therefore, to be made either in the spring or autumn, when they dry more equally; but to cure their being sufficiently seasoned, Vitruvius remarks it was best not to use them until they had been made two years. At Utica the laws allowed no bricks to be employed before they had been so to dry for five years. Alberti states that the Romans mixed crystalline limestone with the red earth of which they made their bricks; and it appears, in order that the latter might be burnt to a better, holes were made in the larger sizes of men moulding them. It is probable that at Rome the common houses were generally built of burnt bricks, whilst the body of nearly all the public buildings was of burnt brick, faced with marble or stone.

We ought not to forget that the ancient Egyptians and Mexicans also extensively employed bricks; a square truncated pyramid, built of four terraces, near Cholula, for instance, is either built or faced with bricks. The Chinese, of course, knew all about brickmaking; almost needless to mention that the Great Wall, built about 200 years B.C., was of burnt bricks. Turning our attention to bricks manufactured

in early times in Britain, we may say that it is generally admitted that the Romans introduced the art of brickmaking into this country; but it does not appear that they preferred brick to stone, as a rule. Indeed, some writers assert that they never used brick unless compelled to do so in the absence of other material, which is not, however, strictly correct, except in a limited sense.

Of Saxon bricks we know very little, but it is tolerably certain that prior to the time of King Alfred few edifices were erected of that material. In the early Saxon period it seems highly probable that they were of practically the same size and shape as the Roman. There is, however, abundant proof that in their later buildings the Saxons made use of Roman bricks; in much the same manner as we in a "more enlightened" age have in several instances made quarries of old Roman roads.

It is generally believed that brick was in dis-favour in Norman times and until the reign of Henry VII., when considerable progress was made in brick building. To this, however, there are many exceptions, for Leland tells us that in Richard II.'s time the town of Kingston-on-Hull became very rich, and the then Count of Suffolk had the tower greatly enlarged, the whole was enclosed by ditches, and the wall begun, "and in continuance ended and made all of brike, as most part of the houses of the town at that time was. In the wall were four principal gates of brike, the north gate having four wardes between the which and Beverle-gate were twelve tours of brike, yve one of them a postern." And Leland goes on to describe at some length various other edifices built of brick. During the time of Edward I. and II. wall-tiles were made after the Flemish manner. The lower part of a wall was generally composed of ragstone, but the upper was faced with brick on the outside, whilst the inside was of soft stone. Other walls were faced with brick on each side, half a brick thick, and the space between filled with rough stones.

About the middle of the sixteenth century, brick buildings were chequered with glazed bricks of a colour darker than the remainder of the face-work, which was mostly of bricks of deep red, hard, and fairly well burnt. Very little need be said concerning the history of bricks of more recent date. We all know of the agitation for the repeal of the tax on them and its results, both in giving great impetus to the spread of the brick-making industry in this country, and in its general effect on architecture.

OBITUARY.

MR. E. G. PALEY, F.R.I.B.A.—We regret to record the death of Mr. Edward Graham Paley, Lancaster, of the firm of Paley, Austin, & Paley. Deceased succumbed to an attack of typhoid fever on the 23rd inst., in his twenty-third year. Born at Easingwold, York, in 1823, Mr. Paley became a pupil of the late Mr. E. Sharpe, Lancaster, in 1838, and partner in 1845. The firm, which has always been distinguished for its attention to ecclesiastical architecture, designed numerous churches, besides additions to Lancaster Castle, and the County Asylum, Lancaster. Mr. Paley was himself responsible for the designs of the Royal Albert Infirmary Asylum, Lancaster, an institution providing a home for nearly 1,000 imbeciles of the six northern counties. He also designed a number of mansions in the North, including Winmarleigh House for the late Lord Winmarleigh, extensions to Holker Hall for the late Duke of Devonshire, and others. He drew the plans for the principal buildings of the Lancaster Banking Company, for the extensive wagon works at Lancaster, and the jute works at Barrow-in-Furness, and designed the principal stations on the Lancaster and Carlisle section of the London and North-Western Railway, and also on the Furness Railway. The partnership with Mr. H. J. Austin, the surviving principal of the firm, which began in 1858, gave additional prominence to the ecclesiastical branch of architecture—both Mr. Paley and Mr. Austin being the sons of clergymen—and a very large number of churches and places of worship in all parts of the country were from their designs. Amongst works on which he was engaged in Lancaster was the erection of a new infirmary, which, though nearing completion after great efforts to raise the money, he has not lived to see finally completed. Mr. Paley took great interest in archaeology, and was one of the founders of the British Archaeological Society, which began its existence at Lancaster just over fifty-one years ago.

GENERAL BUILDING NEWS.

RESTORATION OF LITTLE BERKHAMSTEAD CHURCH, HERTS.—The parish church of St. Andrew was, on the 19th inst., reopened

after restoration, by the Lord Bishop of St. Albans. The stalls and benches throughout are of carved and moulded English oak, the gift of members of the Wormald family, long resident in the parish. The pulpit, altar-rails, open-timbered south porch, lectern, litany desk, and cross over the roof-beam are all of the same material, being memorial gifts, as is also the altar itself, the offering of neighbouring clergy in memory of Thomas Ken, Bishop of Bath and Wells, who was born in the parish, and whose well-known hymns were used at the services. One memorial window, by Messrs. Lavers & Westlake is fixed, and others are in contemplation. The nave is divided from the aisle by an arcade of two bays in lieu of the former mean post of deal, and the shingle-covered belfry and spire are now carried by massive oak posts direct from the church floor. The floors are covered throughout with wood blocks under the benches, and Godwin's tiles in the sanctuary and all gangways, from special designs. The church is warmed by Mr. de Ridder's method. A double sedilia and piscina have been provided, and, during the progress of the works, the old piscina was found, broken up and inserted in a modern wall, almost identical with the new one. Oak arched screens divide vestry and organ chamber from choir and aisle. The general contractor is Mr. B. Wilford, of Newport Pagnell. The carving is by Mr. Hitch, of Vauxhall, and the whole of the works have been carried out from the designs and under the superintendence of Mr. E. Swinfen Harris, of London and Stony Stratford.

BOARD SCHOOL, BEDMINSTER.—A new board school has just been opened in South-street, Bedminster. The school, which is to accommodate 1,400 children, is to be used for three departments—infants, juniors (mixed), and seniors (mixed). There are nineteen class-rooms and three assembly-halls, one for each department. Lavatories, cloak-rooms, and teachers'-rooms are also provided, and the cost is just over 15,000*l.*, which includes furnishing. The building is a two-storied one. The architect was Mr. W. V. Gough, and the builder Mr. Beavan.

OFFICES FOR THE COMMISSIONERS OF SEWERS.—The foundation-stone of the new offices of the City Commissioners of Sewers, which are to be erected on a site in Basinghall-street, adjoining the Guildhall Library, was laid on Tuesday by Mr. Alderman Bell, chairman of the Commission. The plans for the new building, which is to be completed in twelve months at a cost of 32,266*l.*, were prepared by the late Engineer of the Corporation, Colonel Haywood. In the new offices there will be a total floor accommodation of 20,750 ft. super, or 13,000 ft. more than the area of the existing offices. The new court room, which will be on the second floor, will be more than double the size of the present one, and increased accommodation will also be provided for the principal Clerk and his staff, the Engineer and his assistants, the Inspectors of Pavements, &c., besides which suitable offices will be found for the Medical Officer of Health, the Electrical Inspector, the Rate Collectors, and the Sanitary Inspectors. The building will be of fire-proof construction, and a passenger-lift will be provided to all the floors. The builders are Messrs. Chessum & Sons, and Mr. D. J. Ross is the engineer.

RENOVATION OF CATHOLIC CHURCH, HULL.—The St. Charles' Catholic Church, Jarrett-street, Hull, was re-opened on the 20th inst. The interior has almost entirely been remodelled, from the designs of Messrs. Smith, Brodric, & Lowther, architects, Hull. The main roof of the church has been stripped of the old slates, and entirely re-slatted. The flat ceiling has been removed, and the king-post roof so altered that an enriched and panelled coved ceiling now runs the entire height of the church. The walls of the church on the east and west sides have been pierced, and arcades of three bays each now connect the body of the building with the new aisles. These new aisles have been built on the east and west sides. In the west aisle are three carved oak confessionals, recessed in the wall; also a Lady Chapel, with an ornamental fibrous plaster ceiling, in the centre of which is a cupola light, filled with tinted cathedral glass. There is also a shrine of Our Lady of Perpetual Succour, and at the end of this aisle is the Sacred Heart altar. On this side of the church are also the sacristies, which have been considerably enlarged, and are connected with the presbytery by a glass conservatory. The old gallery stairs have been taken away, and there is now a direct exit from the new aisle on the east side. The organ has been removed from the centre of the gallery, and placed in an alcove over the entrance, thus giving greater sitting accommodation for the congregation. The seating in the body of the church has been re-arranged, there being now a centre aisle, leading direct to the sanctuary. The sanctuary itself has been enlarged by the removal of the two side altars, and altering the curve of the communion rails. The contractors are Messrs. Colley & Levett, and the sub-contractor Mr. G. L. Scott, joiner; Mr. Beal, plumber; and Messrs. King & Co., ironmongers. Messrs. George Jackson & Son, of London, have done the whole of the fibrous plaster. The church is now lighted throughout with electricity.

CONSTITUTIONAL CLUB, BOVEY TRACEY, DEVONSHIRE.—On the 17th inst., the foundation-stones

were laid at Bovey Tracey of a new Constitutional Club. The Club is situated in Fore-street, near the centre of the town. The main elevation towards Fore-street will be of red pressed bricks, relieved with buff bricks and cement dressings, the roof being covered with grey slates. On the ground floor is a central entrance, with reading and card-rooms on either side; hall and staircase, with lavatories, &c., and in the wing in the rear, kitchen, and other offices for the use of the caretaker. On the first floor, extending the full length of the frontage to Fore-street, is a large room for meetings, with a projecting balcony from the centre window opening over the main entrance, and in the rear, lavatory and retiring-rooms. On the second floor are a billiard-room, lighted by means of a large lantern light in the roof, and a small committee-room adjoining. The works are being carried out by Messrs. Winsor, Aggett, and Mardon, of Bovey Tracey, from the designs and under the superintendence of Messrs. J. W. Rowell & Son, architects, Newton Abbot.

EMPIRE THEATRE OF VARIETIES FOR SHEFFIELD.

—The Empire Palace of Varieties Company, Limited, have let the contracts for the erection of one of their Palace of Varieties in Sheffield, and work will be commenced at once. The building will accommodate 3,000 people. Mr. F. Matcham is the architect.

HOME FOR NURSES, NEW CROSS.—Captain C. Andrew, Chairman of Committees of the Metropolitan Asylums Board, recently opened the new Home for Nurses at the South-Eastern Fever Hospital, New Cross. The establishment is connected with the hospital by a covered way, and contains a large sitting-room, dining-room, and a fine hall and staircase, all floored with polished Austrian oak. Every nurse has a separate bedroom, and upon each landing are presses to hold all clothing worn in the wards. The architect is Mr. John S. Quilter.

BENLEY HEATH ASYLUM.—The Asylums Committee of the London County Council, at a meeting on Tuesday, appointed Mr. G. T. Hine architect for this hospital. It may be remembered that the committee formerly endeavoured to obtain an architect to carry out the work at a salary of 800*l.* a year, giving up all other work till the completion of the Asylum; an expedient which naturally failed, and which should hardly have been proposed, as it was a very inadequate way of recompensing any competent architect for such work. The committee then obtained powers to select and appoint an experienced architect and give him a fee of 10,000*l.* in lieu of commission and expenses. This condition was advertised, and from among a number of applications six were selected for consideration and were interviewed, and the appointment was finally given to Mr. Hine. The new Asylum is to be for the same number of patients as Claybury—two thousand; and the committee have made a grant of 250,000*l.* as the cost of the building, exclusive of land equipment. It is a pity this course was not taken at first, instead of putting so many architects to inconvenience in regard to the first very ill-judged proposal.

CHURCH SCHOOLS, BARNSTABLE.—A new Church School was opened at Barnstable on the 22nd inst. The building is in the Geometrical style. On the ground floor there is a room 45 ft. by 25 ft., which is to be used as an infant school. The school will afford accommodation for 170 infants. There is a large class-room adjoining, and there are kitchen and offices on the same floor. On the first floor there is a parish-room 70 ft. by 25 ft., and 28 ft. high, there being a gallery at the west end. The room will accommodate 500 persons. Adjoining it are a committee-room and a ladies' lavatory. There are two external staircases leading to the parish-room, and there is also an internal staircase. All the rooms are heated by means of hot-water pipes. The building is of Tavistock stone, with dressings of Marwood and Bath stone. The architect was Mr. W. C. Oliver, of Barnstable, the contractors being Messrs. Garland Bros. (masonry and carpentry), Messrs. Youngs & Sons (stonework), Mr. W. Allen (glazing), and Mr. G. Carter (plumbing).

SANITARY AND ENGINEERING NEWS.

SEWERAGE WORKS, SANDBACH.—Colonel C. H. Luard, an Inspector of the Local Government Board, held an inquiry at the Sandbach Town Hall on the 3rd inst. with reference to an application made by the Sandbach District Council for permission to borrow 6,000*l.* for the purpose of carrying out important extensions in connexion with the sewerage of the town and for the provisions of sewage disposal works. The scheme has been prepared by Mr. E. Codling, C.E., of Manchester. The outfall works are to be on the International Company's plan, and will include the new form of circular tank, with provision for the removal of the sludge whilst the tank is in full operation, by means of the Candy sludge removal apparatus. The sewage, after precipitation by means of ferrozene, will then be filtered by means of polarite.

MACCLESFIELD SEWAGE DISPOSAL.—An inquiry was held on the 9th inst. by Major-General Crozier, R.E., Inspector to the Local Government Board, to consider an application from the Macclesfield Town Council for sanction to a loan of 60,000*l.* for sewerage and sewage-disposal purposes. Mr. W. H.

Radford, C.E., of Nottingham, Engineer to the scheme, gave evidence that the Macclesfield Corporation had obtained a provisional order, and had already purchased 59½ acres of land, below Prestbury, for the sewage disposal. The dry weather sewage is 800,000 gals. a day, and manufacturers' foul liquids, 200,000 gals., making 1,000,000 gals. a day in all. At present all the sewage is turned into the river, which is black and filthy. The Corporation originally proposed an irrigation scheme, but this had been altered, with the Engineer's approval, to precipitation and land filtration, in consequence of the opposition met with from the land-owners, in order to get a better effluent, and because of the heavy price they would have had to pay for a larger area of land. The sewage will be delivered by gravitation and first clarified in Dortmund tanks, followed by a second clarification process in ordinary rectangular tanks; the effluent will then be filtered through coke beds, and finally filtered through 59½ acres of land. The land will be well drained and laid out with sewage carriers. The mud will be pressed, and all the arrangements will be of the most modern character. The whole of the sewage of the borough will be collected by means of intercepting sewers following the course of the river and tributaries, and will then be conveyed through a 2-ft. outfall-sewer to the disposal works, situated about three miles below Macclesfield. Iron pipes will be used for the large sewers where there is much water. There was some opposition from the County Council, who asked for a special sewer to be laid in Victoria-road for the convenience of the County Asylum. The County Council also asked for a special clause giving them additional powers to control the works passing under Beech Bridge and Prestbury Bridge, but they afterwards withdrew the opposition as to the bridges. Mr. Legh's representative asked that a storm overflow at Prestbury Bridge should be dispensed with, that there should be no sewer-ventilators near that bridge, and that the sewer at Broken Cross should be deepened. The Macclesfield Rural District Council asked that the sewage of Prestbury should be received into the Macclesfield sewer. The inspector made appointments to view the district on the following Saturday, and said he would report in due course.

DOVECOTE BRIDGE, WALTON, CUMBERLAND.—The inspection and formal opening of this recently-erected bridge, which spans the River King at the ford at Dovecote, near the village of Walton, was made on the 15th inst., by Mr. G. J. Bell, the County Surveyor. The bridge, which has been erected at a cost of 900*l.*, crosses the ford on the road leading from the village of Walton to Dovecote, Burtholme, Lanercost, and Naworth. It is practically on the site where the Roman wall crossed this river. The bridge, which was designed by Mr. Bell, is built of Lees Hill stone, and has been constructed by Mr. Telfer. The span is 50 ft., and the width within the parapets 17 ft. 6 in.

STREET IMPROVEMENTS AT HALIFAX.—Colonel Hasted, R.E., one of the Inspectors of the Local Government Board, held an inquiry at Halifax on the 17th inst. into an application of the Town Council for sanction to borrow 24,212*l.* for works of street improvement, &c.

FOREIGN AND COLONIAL.

FRANCE.—The fourth exhibition of the "Rose Croix" Art Society will open on the 20th of March, in the "Galerie des Artistes Modernes," 5, Rue de la Paix. —M. L. Alguire, the sculptor, and Mr. Daumet, the architect, have been elected as associates of the members of the Royal Academy of Belgium. —A monument to the celebrated chemist, Boussingault, is to be erected at the Conservatoire des Arts et Métiers, in the court facing the church of St. Nicolas-des-Champs. It will be executed by M. Dalou, and is to consist of a marble column, at the foot of which will be seated a female figure, symbolising "Science," and a peasant personifying "Agriculture," stretching out palms towards the bust of Boussingault, which will crown the column.

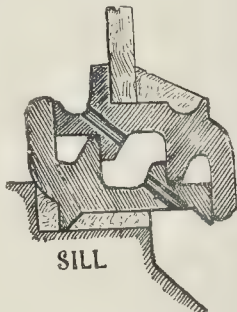
—The jury of architecture at the Ecole des Beaux-Arts has given its award on the Godefruid competition, the subject of which was "Le pont d'appui milieu d'un pont suspendu." Among 157 competitors, the jury awarded the prize to M. Mayeux, pupil of M. Laloux. —M. J. Baconnier has obtained the first prize in the architectural competition instituted by the "Société Académique d'Architecture" at Lyons; the subject of which was "Un projet d'hôtel pour le Gouvernement Militaire de Lyon." M. Meyneux obtained the first prize in archaeological competition, the subject of which was "A Restoration of the Plan of Lyons in the XVIIIth Century." —The Municipality of Bordeaux have opened a large disinfecting establishment, fitted with all the most recent improvements, the light being conducted at the railway station at Poitiers to give more easy communication for passengers with the town, which is situated on a height above the railway station. —The Lyons Railway Company are about to build a bridge over the Rhone at Avignon, in order to connect the main line from Paris to Marseilles with that on the right bank of the river. —M. Chenevier, architect, of Verdun, has been elected President of the "Société des Architectes de l'Est," the Honorary Presidents being M. Charles Garnier, of Paris, and M. Cuny, of Nancy.

According to the plans of M. Issartier, the engineer, the projected railway up Mont Blanc will start from the ravine of Miage, above Saint Gervais; it thence follows a tunnel 7,400 metres long, and its final ascent will be made through a shaft 2,800 metres in vertical height. The cost is estimated at 9 million francs. —M. Edouard Bassac, architect, of Vannes, has died at the age of fifty-four. He was a member of the Société Centrale, an architect of the arsenal, the barracks, and the way terminus at Vannes. He was an "expert" in the Cour d'Appel of Rennes, and a Chevalier of the Legion of Honour.

MISCELLANEOUS.

LIVERPOOL AND THE ATLANTIC PASSENGER TRAFFIC.—The Mersey Docks and Harbour Board, with a view to provide increased accommodation for passengers by trans-Atlantic and other steamers, have commenced the following works:—The new passenger station at the west side of the south end of the Prince's Dock, with offices and railway line connected with the main lines of the dock railway at an estimated cost of 32,000*l.*; laying down on the east side of the Waterloo grain warehouse suitable crossings to form a connection between the main dock lines and those of the London and North Western Railway Company at the Waterloo Goods Station, at an estimated cost of 800*l.*; strengthening the shore and stage connexions, and Nos. 4, 5, and bridges of the Prince's Landing-stage, also deepening the water approaches opposite thereto, so as to allow Atlantic passenger and other large steamers to come alongside, at an estimated cost of 7,000*l.* The consent of the Corporation to use locomotives on those portions of the line which are on the public streets has been granted on condition that the speed must not exceed four miles an hour; that the train must not exceed fifty yards in length; that the daytime each engine must be preceded, at certain distance, by a man carrying a danger-flag and that at night both the engine and train must carry lights. The London and North Western Railway Company has agreed to make all the necessary alterations and improvements for fitting the Waterloo tunnel for passenger traffic, and the entire scheme is expected to be ready by the next Atlantic passenger season. The above plan only temporary, as even with the present traffic, the Prince's Landing-stage in the summer season would be quite inadequate for both the American, coastwise, and the other foreign traffic. The Dock Board is said to have under consideration a nearly mature plan for the construction of a much larger landing stage between the Waterloo and Victoria Docks, the accommodation of the latter trades.

ADAMS' IMPERVIOUS CASEMENT FRAMES.—Accompanying is a section of the sill and foot-rails of these iron frames; a section which seems adapted to keep out even the most driving rain. There are four meeting-surfaces and three water-traps.



channels on the sash and fixed frame. The moisture formed inside is collected and passes outside, for which purpose a channel is provided also a groove to give a good hold for the putty. The makers are the Adams' Building Trade Emporium, London.

ROYAL SOCIETY OF ANTIQUARIES OF IRELAND.—At the meeting of the Royal Society of Antiquaries of Ireland, on the 8th inst., at Leinster Hall, Dublin, Mr. Thomas Drew, R.H.A., F.R.S., President of the Irish Institute of Architects, was on a poll, re-elected President of the Society of Antiquaries.

CHURCH BUILDING SOCIETY.—The Incorporated Society for Promoting the Enlargement, Building and Repairing of Churches and Chapels, held its usual monthly meeting on the 17th inst., at the Society's House, Dean's-yard, Westminster, at 8 P.M. Norman in the chair. Grants of money were made in aid of the following objects—viz., building new churches at Lower Sheringham, St. Peter, Cromer, roof; Nottingham, St. Bartholomew, roof; and South Tottenham, St. Peter, Middlesex, used, monthly meeting on the 17th inst., at the Society's House, Dean's-yard, Westminster, at 8 P.M. Norman in the chair. Grants of money were made in aid of the following objects—viz., building new churches at Lower Sheringham, St. Peter, Cromer, roof; Nottingham, St. Bartholomew, roof; and South Tottenham, St. Peter, Middlesex, used, monthly meeting on the 17th inst., at the Society's House, Dean's-yard, Westminster, at 8 P.M. Norman in the chair. 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357. A grant of *vol.* was also made from the London Buildings Fund towards building St. Katharine's Mission Church, Plaistow, Essex. The following grants were also paid for works completed: Wydon, St. Peter and St. Paul, near Norwich; Bucknell, St. Peter, near Biester, Oxon, *vol.*; Southwark, St. Saviour, Surrey, *vol.*

CITY AND GUILDS OF LONDON INSTITUTE.—Annual distribution of prizes and certificates to the technical schools in connexion with City and Guilds of London Institute took place the 17th inst. at the Fishmongers' Hall. The list showed that at the close of the session out of six matriculated three-year students at the Royal College, Kensington, thirty had been deputed the diploma. At the Fishmongers' Hall, thirty-eight students had obtained certificates. The Institute has continued to co-operate with the London School Board and the Drapers' Company in supporting the manual training classes elementary schools. The distribution was made Lord Lorne, who, in his address, commended practice of the Institute in taking up a variety of subjects of instruction so that the commercial character of the country might be maintained. He pointed out that the City Guilds were the first to note the establishment of technical schools, and suggested that the time had arrived for the Government to come to their assistance by forming a sort of central organisation through which, when, with special assistance, might be drafted into schools.

ST. JOHN'S BRISTOL CROSS AT STOURHEAD.—renovation of this old cross is being undertaken. Work is being carried out under the superintendence of Mr. Charles E. Ponting, F.S.A., a local architect for the county of Wilts. The work is being carried out by Messrs. Harry Hems & Co., sculptors, &c., of Exeter.

BUILDING TRADES ASSOCIATION OF MANCHESTER.—The first annual general meeting of this Association was held the 16th inst. at the Albion Hotel, Piccadilly, Manchester. The chair was occupied by Mr. R. and, who was supported by Mr. R. Neill, Jun., G. Macfarlane, Mr. C. H. Normanton, and others. The report, which was presented by the Secretary (Mr. Fred Scott), explained the evolution of the Association. Notices of proposed alterations of rules have been received from several of the operative associations, and will be dealt with in course. Resolutions were passed appointing Holland President for the ensuing year, Mr. G. Macfarlane vice-President, Mr. J. Cantrell treasurer, a council consisting of three representatives from the trades and two each from two.

STAINED GLASS WINDOWS AND PAINTED GLASS.—Saturday last, at the Royal Institution, Mr. H. F. Day delivered the first of three lectures on Stained Glass Windows and Painted Glass. The subject of view from which he said he was going to discuss the subject was that of art and craftsmanship, or rather craftsmanship and art, as craftsmen are always the beginning and the root of all that is valuable art, we being workmen first and then artists. The industry of glassmaking was to be five or six thousand years old, but the might well be content to take it for granted from ancient Egypt it had found its way to France, where stained glass windows were now known the first came into use, and it certainly came from France that we in England first stained glass. The earliest glass to which date could be given was French, and belonged to the year 1168, the oldest window in England that dated 1174 in the choir of Canterbury Cathedral. Even in the twelfth century stained glass was a rarity, and in speaking of early glass, of the thirteenth century was generally meant, when churches first began to be glazed with pigments, and, of course, stained glass in the days was identified entirely with the church. Day discussed the advance of art up to the end of its decline and collapse in the seventeenth century, and showed at what cost of decorative values the later masterpieces were produced. The stained glass was in some degree applicable to the windows of the seventeenth and eighteenth centuries. In either case there was stained glass and there was painting upon it, the difference being that in the one the painting was only resorted to help out the stained glass, and in the other the stained glass was introduced only to help out the painting. The earlier glass was "stained in the kiln" and the artist was as yet not a painter but a glazier. He really did glass mosaic, and put other the window like the pieces of a puzzle.

JOINT SURVEYORSHIP APPOINTMENT.—Mr. G. William Bay, Assistant Surveyor to the Kettering Urban District Council, has received the appointment of Joint Surveyor of Saffron Walden, Essex.

LEGAL.

ATTEMPT FOR THE PUBLIC HEALTH ACTS.

The case of the Ilkley Local Board *v.* Oswald came before Mr. Justice Chitty in the County Division, on the 18th inst., it being a case for the plaintiffs for the commitment of the defendant to prison for contempt of court. The

action was one for an injunction to restrain the defendant from proceeding with the erection of certain buildings contrary to the provisions of the Public Health Acts, or of the plaintiffs' by-laws. It appeared that interim proceedings were taken by the plaintiffs, and from time to time adjourned, the ultimate result being that on December 5 last a consent order was taken, giving the plaintiffs liberty to set down the action for trial if they thought fit. On December 12, 1894, when the local election was pending, the defendant, who was a candidate, wrote and caused to be printed a circular, 1,500 copies of which were distributed amongst the ratepayers of Ilkley. The circular, amongst other things, referred to the "spiteful proceedings" instituted against the defendant by the Board, and also attacked the honesty of its members, and also said that his Lordship "had told them to do their business more honestly." The plaintiffs contended that the defendant had committed a gross contempt of court by making such comments when proceedings were pending; but it was aggravated by the circumstances that the defendant had no foundation whatever for the statements he had made, and that his Lordship had made no such remark as that appearing in the circular. It appeared also that the defendant had some time previously written a letter to the local press containing irregular comments, and had been upbraided by his Lordship.

At the conclusion of the arguments of counsel, his Lordship, in giving judgment, said that the circular was clearly a gross contempt of court. It contained misrepresentations of what took place in Court. The statements made by the defendant were not merely incorrect, but they reflected most seriously on the plaintiffs. There was no foundation whatever for them. The defendant had already been warned by the court, but the warning did not appear to have had any effect. He had offered an apology, and it was also said on his behalf that he was an uneducated man. Taking these circumstances into consideration the order would be that the defendant should be committed for ten days, and to pay the costs.

Mr. Farwell, Q.C., and Mr. Pattison appeared as counsel for the plaintiffs, and Mr. Eustace Smith for the defendant.

CASE UNDER THE METROPOLIS MANAGEMENT ACT, 1855.

The case of *Pilbrow v. the Vestry of St. Leonard's, Shoreditch*, came before the Court of Appeal, consisting of the Master of the Rolls and Lords Justices Lopes and Rigby on Monday last.

The facts of the case are shortly as follows: Mr. Pilbrow (the appellant) in 1882 erected two blocks of buildings, consisting of forty-six sets of apartments, which were separated by a causeway 20 ft. wide. The two blocks were drained by twelve branch drains which were connected with a main drain which ran beneath the causeway into the sewer. In 1891, the Inspector of Nuisances gave Mr. Pilbrow notice to mend and re-construct the main drain, and the notice having been disregarded, the Vestry did the work at an expenditure of 209l. 7s. 6d., which they now sought to recover from Mr. Pilbrow, who, however, disputed the claim on the ground that the main drain in question was a sewer within the meaning of the Act, and that therefore he was not the owner, and maintaining that the vestry were liable for the expense of altering it. The magistrate who tried the case decided against Mr. Pilbrow, holding that inasmuch as the main drain in question drained blocks of houses by a combined operation it was under the circumstances, and notwithstanding the absence of any order of the vestry, for the purpose of "drain" and not a "sewer" within the meaning of the Interpretation Clause, Section 250, of the Metropolis Management Act, 1855, and ordered Mr. Pilbrow to pay the amount charged. The magistrate, however, at the wish of the appellant stated a case for the opinion of the High Court, and the case was argued before Justices Mathews and Charles, who affirmed the magistrate's decision.

At the conclusion of the arguments of counsel their lordships (Lord Justice Rigby dissenting) dismissed the appeal with costs.

Mr. Haldane, Q.C., and Mr. Woodfin, appeared as counsel for the appellant; and Mr. Finlay, Q.C., and Mr. Lewis Thomas for the respondents.

THE ERECTION OF BATHS AND WASH-HOUSES:

CONTRACTORS' DISPUTE.

In the Court of Appeal on Monday, Lord Halsbury and Lords Justices Lindley and Smith had before them the case of the Commissioners for Public Baths and Wash-houses for the parish of St. John, Hackney, *v.* Roome. This was the plaintiffs' appeal from the decision of Mr. Justice Stirling dismissing their motion.

Mr. Moulton, Q.C., and Mr. Lowe appeared for the appellants; and Mr. Graham Hastings, Q.C., and Mr. Bray, represented the respondents.

Mr. Moulton said this was an appeal from the decision of Mr. Justice Stirling, who declined to

make an interim order directing the defendant to give up certain premises belonging to the plaintiffs, which he held for the purpose of carrying out certain work. The plaintiffs were the Commissioners of Public Baths and Wash-houses in the parish of St. John's, and on February 16 last they entered into a contract with the defendant to build certain baths and wash-houses. The work was to cost about 35,000l., and was to be completed within a year. The work was commenced on February 26 last, and in July the defendant made complaints that the clerk of the works was not very easy to get on with, and an inquiry was held with regard to it. On October 22 the defendant wrote to say that the clerk of the works was very troublesome, and that he would suspend the works. Thereupon the plaintiffs—there being a clause in the contract which provided that if the works were suspended or not gone on with with reasonable speed they could give notice to proceed, or, in default, take possession—gave notice that if the works were not gone on with they would take such steps as the contract empowered them to take. To this notice the defendant's solicitors replied that they had advised him to comply with the notice and proceed with the work, and then decide what damage he was entitled to with a view to the whole thing being submitted to arbitration, and that they might take it that the defendant would proceed at once, though he would reserve all rights against the Commissioners for the heavy damages he had suffered. Since that time, continued counsel, there had never been more than four men employed, although the contract stated that 80 to 120 men were to be employed throughout the whole year. The plaintiffs waited for a time, but finding nothing going on gave a second notice. Nothing further was done by the defendant, and after seven days had expired the plaintiffs sent their architect and one of their representatives down to take possession. The defendant, however, refused to give up the premises, and gave instructions to turn the plaintiffs' representatives out if they did not go, and from that time till now he had held possession of the works; he would not complete them and would not let the plaintiffs do so. After the first suspension, which had, in fact, lasted up to the present time, he called his creditors together and put forward a statement of affairs which showed that he was not a solvent man. He had not done the work, he would not do the work, and the building was standing in an unfinished condition, thereby suffering great damage.

Lord Justice Lindley: What happened when his creditors were brought together?

Mr. Moulton: No arrangement was made, but he has not been made bankrupt. His statement showed there was a deficiency of 2,000l. or 3,000l. He thought it reasonably clear that the man was not in a position to undertake work of this kind. The Commissioners made an arrangement that if he went on he should not have any more trouble with the clerk of the works. They claimed that under the contract they were entitled to take possession, but this was met by the defendant pointing out that there was an arbitration clause in the agreement, but as far as possession was concerned there was no need of arbitration.

Lord Halsbury: If it is your clerk of the works, who is your agent, that prevents him going on with the works, is that not a question for the arbitrator?

Mr. Moulton: The clerk of the works has to submit everything to the architect. What I say is that the defendant is there for the purpose of doing this work. It cannot be right that he should be there and do no work. He cannot say that past difficulties entitle him to retain possession without going on.

Lord Justice Lindley: What was your notice of motion, and what was your claim?

Mr. Moulton: It is for an injunction to restrain the defendant from retaining possession and from preventing the plaintiffs from entering upon and taking possession of the works referred to. Mr. Justice Stirling took the view that the relief we asked for in the action could not be granted by an interim injunction.

Mr. Graham Hastings said that if his friend's clients would go to arbitration at once they would give up possession.

Mr. Moulton: We will go if you give us possession.

Lord Halsbury: Then there is an end of the matter.

Mr. Moulton said before the contract was given to the defendant certain securities had to be given. By consenting to this order he did not want to imperil his position in regard to those guarantors. With that exception he was ready to go to arbitration.

Lord Halsbury: Is there anybody here representing the guarantors?

Mr. Moulton: I should think my friend is not very far from that position. It is a matter of great importance to them.

Mr. Graham Hastings pointed out that the guarantors were not before the Court.

Lord Halsbury: How do you say this affects the guarantors?

Mr. Moulton: Why, if we agree to vary the contract by consent the guarantors might say they only agreed to the performance of the original contract.

Lord Halsbury: Don't you think it had better be

WEDNESDAY, JANUARY 30.
Northern Architectural Association.—7.30 p.m.

TWELVE GOLD AND SILVER MEDALS AWARDED.

IRON CISTERNS.

F. BRABY & CO.

VERY PROMPT SUPPLY.

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The Builder.

VOL. LXXVIII. No. 2715.

FEBRUARY 9, 1895.

ILLUSTRATIONS.

The Abbey of Great Britain.—IX., Tynemouth.—Drawn by Mr. E. Ridsdale Tate. *Double-Page Ink-Photo.*
Ground Plan and Details of Tynemouth Abbey.—Drawn by Mr. E. Ridsdale Tate. *Double-Page Photo-Litho.*
Proposed Church of St. Bartholomew, Ipswich.—Mr. Charles Spooner, Architect. *Double-Page Ink-Photo.*
Design for East Window, Church of SS. Simon and Jude, Southport.—By Messrs. Shrigley & Hunt. *Double-Page Ink-Photo.*

Blocks in Text.

Sketches of Tynemouth Abbey. Pages 85, 86

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Wind Pressures on Buildings.



It has for some time past been recognised that certain time-honoured formulae much used for calculating the effect of wind pressures on surfaces—such as roofs of buildings—inclined at an angle to the direction of the air currents, are not to be depended upon, and that a larger margin of safety than was formerly considered necessary is advisable when using them. One excellent reason that pressures are in excess of those calculated is that the reduction of pressure on the leeward side has not been sufficiently allowed for, the action of induced currents not having been so well understood, or, at any rate, so generally recognised when these formulas were constructed as they are in the present day. So far as we are aware Mr. Horatio Phillips, an experimenter whose work in this direction has not received the acknowledgment it deserves, was the first to draw attention to the rarefaction of the atmosphere on the leeward side of a hill or roof-like structure, and we well remember some years ago witnessing experiments of his which not only proved the fact but gave quantitative results. Since then other investigators have pursued the subject. The latest addition to our knowledge on this question has been supplied by a Swedish experimenter, Mr. R. Irminger, who has recorded the results of his investigations in the form of a paper, published in the *Ingeniøren* of Copenhagen, and a translation of which may be found in the Library of the Institution of Civil Engineers.* The experiments were made with models, and though some correction might be necessary in applying the results to larger planes, yet the results clearly indicate that the question of wind pressures on roofs requires reconsideration.

As is pointed out, experiments on wind pressure have been usually made by means of an apparatus in which the body subject to pressure revolves under the influence of the moving current. Mr. Irminger proceeds on the more exact method of causing the air current to impinge on the surface

when stationary. This was the method formerly pursued by Mr. Phillips, who, however, obtained an induced current by means of steam jets, whilst Mr. Irminger has recourse to an opening in a tall chimney. In this was inserted a horizontal wooden tube 9 in. by 4½ in. in section. Experiments were made with inclined planes, prisms, spheres, cylinders, pyramids, and cones. The planes were each represented by two thick iron sheets placed one-tenth of an inch apart, and their edges connected all round, thus forming a shallow closed box. Holes were bored in both surfaces, and these could be plugged at will. The pivot on which the plane swung was a pipe leading to the interior of the box and having a pressure-gauge on the end. In this way any increase or reduction of pressure on either surface of the box-like plane could be ascertained.

A plane 4½ in. by 1½ in., and occupying the full width of the tube, was tried at various angles of inclination and with four velocities of air. When the plane was at an inclination of 5 deg. to the direction of the wind the percentage of the total pressure which was produced on the leeward side of the plane was 100 at all velocities of wind tried, and the total wind pressure was 23 per cent. of what it would have been had the plane been normal to the air current. By "pressure on the leeward side of the plane" is meant the pressure on the leeward sheet of iron. This pressure would naturally be in the direction of the wind, and would be caused by the reduction of atmospheric pressure on the opposite side, due to rarefaction. At an inclination of 10 deg. with an air velocity of 49·5 ft. per second, the proportion of total pressure on the leeward side was 82 per cent., and at 31 ft. per second the pressure on the leeward side was 91 per cent. The proportion of total wind pressure at this angle, as compared to the same area of normal plane, was 45 per cent. At 40 deg. inclination of the plane, and with a velocity of 49·5 ft. per second, 65 per cent. of the total pressure was due to the leeward side; at 31 ft. per second it was 70 per cent. The proportion of pressure as compared to the normal plane was 75 per cent. at this angle. At 90 deg. inclination of the plane, and 49·5 ft. per second of air current, the proportion of total pressure due to the leeward side was 56 per cent.; at 31 ft. it was 59 per cent., and at this angle the total pressure was equal to that which would have been

sustained had the plane been vertical or normal to the current. We have, for the sake of brevity, selected only a few typical instances contained in Mr. Irminger's tables, and the figures as to the proportion of pressure as compared to normal planes are averages of a larger number of experiments than we quote.

The plane referred to, having its ends touching the sides of the box, may be considered as a plane of infinite length. Mr. Irminger tried a similar series of experiments with a plane 2 in. shorter—viz., 2½ in. by 1½ in. At 5 deg. inclination the results were similar to those obtained with the larger plane at the same inclination, excepting that the proportion of total pressure as compared to the normal plane was but 12 per cent. At 10 deg. inclination also the whole of the total pressure was due to the leeward side, but the pressure was 26 per cent. of that due to a normal plane. At 40 deg. inclination and 49·5 ft. per second air current, the proportion of total pressure due to the leeward side was 78 per cent.; at 31 ft. per second it was 74 per cent., and the proportion of total pressure compared to the normal was 74 per cent. At 90 deg. inclination, and 49·5 ft. per second, the leeward effect was 48 per cent. of the whole; at 31 ft. per second it was 46 per cent. of the whole. The total pressure at this angle, as with the other plane, was equal to that of a normal plane.

These figures are extremely interesting; and it will, we think, be somewhat of a revelation to many persons to find how much influence the reduction on the leeward side has upon the necessity for strength in structures having to withstand wind pressures. It is not, however, with single planes (the box referred to was so shallow that it has been considered as a plane) that the architect and engineer has so much to deal, as with more complex structures comprising several planes, and here also Mr. Irminger supplies us with useful information, from which we can quote but a few details. By a series of experiments on long prisms placed with their axes at right-angles to the wind the effect of rarefaction on solid bodies is shown. The total pressure (57 per cent. of which was due to rarefaction) on a long plane of a given width *s*, placed normally to the wind, and of the same length as the prisms, is taken as a standard, and is denoted by *p*. In a prism, the section of which was a square of side *s*, with the wind parallel to the side,

* See also Minutes of the Proceedings Inst.C.E., Vol. cxviii.

the total resultant pressure in the direction of the wind was $0.05 p$, the proportion due to rarefaction being 43 per cent. In a similar square turned so that the wind was parallel to the diagonal the total resultant pressure was $0.79 p$, with 76 per cent. rarefaction. With the section a circle of a diameter s , the total resultant pressure was $0.57 p$, the percentage due to rarefaction being 72. In another series of experiments made with a sphere, it was found that only that part of the surface within 35 deg. of the diameter parallel to the wind's direction was subject to positive pressure from the wind, the remainder of the surface having its pressure reduced by rarefaction of the air. Returning to the experiments with prisms, a rhombic cross section presenting an angle of 60 deg. to the wind, the length of side being s , showed a total resultant pressure in the direction of the wind $0.25 p$, 82 per cent. of which was due to rarefaction; a section, an equilateral triangle, side s , gave $0.59 p$ total resultant pressure, with the wind parallel to the side, and $0.42 p$ when the apex was presented to the wind; in the former case the proportion due to rarefaction being 42 per cent. and in the latter 86 per cent. When the prism was turned so that the base was presented to the wind the total resultant pressure was $0.71 p$, the percentage due to rarefaction being 37. It will be noticed here that in shapes with which the percentage due to reduction of pressure on the lee side is greatest the total resistance is least, but in no case quoted does what may be called the rarefaction ratio fall below 37 per cent.

Further experiments were made with other forms. A cube with the wind striking it parallel to the edge showed a total resultant pressure in the direction of the wind of 0.80 of total pressure on a disc equal to the face, the percentage due to rarefaction being 22 per cent.; with the wind parallel to the diagonal of the face the pressure was 0.66 . A cylinder of a height equal to its diameter received a pressure of 0.47 of that which would have been exerted on a square disc equal to a section through the axis, the rarefaction ratio being 50. A pyramid of square base with a side equal to the height gave, with the wind parallel to the side of the base, a pressure of 0.78 of that which would have been exerted upon a disc equal to a maximum section perpendicular to the wind; with the wind diagonal to the base the corresponding percentage was 55. In the former instance the rarefaction was 37 per cent., and in the latter 55 per cent. Lastly, with a cone in which the height equalled the diameter of the base, the resultant pressure was 0.38 of that due to a disc equal to the maximum section perpendicular to the wind, 50 per cent. of the total pressure being due to rarefaction.

We have not space to follow up these results by practical applications. Experiments were made with models representing buildings of various forms. Generally it was found that the effect due to rarefaction on the lee side was quite as important a factor as the actual wind pressure on the windward side. To take an instance quoted of a roof of 45 deg. pitch, the wind blowing at right-angles; the normal pressure sustained by the lee side of the roof, due to rarefaction, was over three times that due to wind pressure on the windward side; the resultant pressure being upward. On the windward side the pressure was found greatest near the lower edge, and, diminishing uniformly, became negative near the ridge. In the case of a model representing a gas-holder with a segmental spherical roof the pressure on the roof was entirely outwards, and the resultant nearly vertical.

We have not thought it necessary to describe the ingenious manner by which Mr. Irminger obtained his records of pressure, or to dwell upon other details of the manner in which the experiments were carried out. These, as well as much other interesting information, may be found in the original, and would well repay careful study.

THE COUNTY COUNCIL ELECTION.

THE approaching County Council election is a matter of serious importance to the inhabitants of London. It means that by the force of that election they empower certain persons to govern the Metropolis and to spend the money of the ratepayers for the next three years. With anything in the nature of political questions we have no concern, but some of the matters upon which the coming election will turn have from time to time necessarily been commented on in these columns. It is desirable, therefore, to refer briefly to some of the points which have been touched on in the recently-issued statement of policy of the "Moderate" party.

The first of these which requires some notice is that which is concerned with the Works Department of the Council. Now, on this we have had something to say from time to time, but we have carefully guarded ourselves against either condemning or approving it without sufficient data. For the first thing to be borne in mind in regard to it, is that it in no way involves a question of principle. "The Progressives have committed the Council to the policy of executing all its work without the intervention of a contractor." Herein lies the mistake of the Progressive party. They regard it as a question of principle: they consider that a municipal body ought to do its own work, whereas it is a question purely of expediency. If the County Council can do its own building and constructive work, with a department of its own, at a less cost to the ratepayers than by employing a contractor, then there can be no doubt whatever that it should adopt this system. If, on the other hand, it is less costly to employ contractors, then that is the plan which a businesslike body will use. When the Moderates say that the undertaking of works on a large scale by the Council involves "the establishment of extensive and costly plant and staff which must always be kept occupied to justify their existence," they have hit a weak spot in the present programme of the existing Council. For it is quite possible that so far as regards a particular piece of work it may appear to cost less if executed by the Council than by a contractor. But at the same time this may be a mere fallacious economy, since after the work is completed the staff and plant have to be maintained, and the cost thereof when added to the cost of a particular work may make such work more costly to the community than if a contractor were employed. But the Moderates go further than this—they say that the actual work as now performed is more costly than it should be. "Particulars of all the works executed for the Parks Committee have been given in a recent report, which shows that while those done by contractors have cost 6 per cent. less than the estimates, those carried out by the Works Department have cost 36 per cent. more. The only houses as yet erected by the Department are those in Poplar and Greenwich. It has been stated in the Council, and not contradicted, that the approximate cost of these buildings shows an excess of 7,000*l.* over the passed estimate." We do not adopt these figures, they may or may not be correct; but they are sufficient to make the people of London demand that the Council shall investigate the question, and shall not, as the Progressives desire to do, go on with the Works Department without considering if its existence is justified. Now the policy of the Moderates on this point is reasonable and businesslike. It is "to place a limit on the extent and character of works to be undertaken directly by the Council, and to insist on a profit and loss account being established, and provision being made for reports by independent experts." The Moderates are willing that the Council should execute works which it is clear can be done by them at a profit to the com-

munity. They are opposed to the Council executing all their own work, by their own Works Department, regardless of cost. No reasonable man can doubt that this is the proper policy, and that on this point alone the Moderate candidates should be supported by the ratepayers of London. To see that numerous and costly works are properly carried out in the Metropolis is one of the main duties of the County Council, and it is an essential element of it that there should be such a supervision as a prudent man of business would give to his own concerns. No prudent man will build a wall by the hands of his own workmen if by so doing it costs him more than it would to employ a builder. The same principle must actuate a municipal body as a private individual, and it is because on this point the policy of the Moderates is sounder than that of their opponents that they are entitled to the support of the people of London.

Coming next to the head of improvements. It is the policy of the Moderates "to undertake without delay such improvements as are admittedly necessary in the public interest, seeking powers by a proper system of recompense to secure for the ratepayers the benefit of increased value imparted to neighbouring land by the improvements." It has been one of the errors of the policy of the present majority of the Council that they have allowed year after year to pass by without taking in hand urgently-required improvements, simply and solely because their pet idea of a "betterment" could not be allowed by Parliament. That system has nothing objectionable in it in principle, but it is most difficult to carry out in practice. The Progressives, had they been actuated by a reasonable business spirit, would have put the betterment question on one side, and have carried out the required improvements without it. Here, again, the policy of the Moderates is more reasonable and business-like than that of their opponents.

Upon the water question the policy of the Moderates is not so satisfactory. They desire to obtain evidence that the acquisition of the undertakings of the present companies will not be more expensive to the ratepayers than the present system, and failing such evidence to obtain more control over the companies. This is rather a half-hearted policy. It is desirable, we feel no doubt, that the supply of water should be in the hands of a public body, though not necessarily of the County Council, and it should be the aim of the Moderates to formulate some scheme for the purpose. While in this respect the policy of the Moderates appears to be wanting in comprehensiveness and to display some want of foresight, it is preferable to that of the Progressives, which appears to be to buy out the water companies without having sufficiently considered all the circumstances of the situation. The subject is really one for the Government; it is too great to be left in the hands of any body of men. It requires financial skill, public foresight, and great business ability, and we trust that the next Government which comes into office will take this matter out of the hands of the County Council and other local bodies, and will introduce and carry through a comprehensive scheme for the supply of water to the Metropolis, which will settle the matter for many years to come. The points on which we have touched are those most within the range of our criticism, and we have not hesitated to express a plain and unbiassed judgment on them. It is for the ratepayers of London to carry out our advice by action at the polls.

If it be objected that this advice is based on views of these questions only, we would add that the want of businesslike capacity exhibited in regard to them has been shown in other matters. Instead of doing the best with their existing powers, the present majority in the County Council has sought to misuse their powers and to absorb the

Corporation of the City. Instead of giving a fair wage for a fair day's work, the Council has looked rather to the interests of their workmen than to those of the inhabitants generally of the Metropolis. In one word, they have acted rather as doctrinaires than as men of business, and it is men of business whom London requires to carry out its local government efficiently.

NOTES.

THE new building connected with the Banqueting House in Whitehall, now the museum of the United Service Institution, has been open for inspection this week. As far as the hall itself is concerned, little beyond the necessary cleansing and painting has been done, except the introduction of incandescent electric lamps and the provision of a system of fire defence. The floor under the main hall, formerly used as a cellar for coals and lumber, has, however, been transformed; the windows have been opened out, the naked brick vaults plastered, and the lower portion wainscotted with the oak panelling taken from the chapel fittings above, thus forming an admirable resting-place for the heavy exhibits, guns and such like, which are admitted on a level with Whitehall-gardens. At the levels of the lower gallery of the hall, and of the upper galleries, doors of communication connect the old building with the new one, which comprises on the ground floor a spacious entrance-hall, porter's room and clerk's office, and members' lavatories; also at the back, facing Whitehall-gardens, a large lecture theatre capable of seating 400 people, with a lecturer's room in connexion. The theatre has a separate exit towards Whitehall-gardens. On the main floor, at the level of the Banqueting Hall, there is a council room and secretary's room facing Whitehall, and a loggia overlooking the theatre at the back, which occupies two stories in height. On the first floor there is a large newspaper-room, the whole length of the Whitehall front, and a reference library over the theatre, accommodating about 30,000 books, also a librarian's room. On the second floor, being the level of the Banqueting Hall gallery, there is a large writing-room to the front, while the top floor is given up to a large topographical room and caretaker's quarters. In the basement is the boiler-room and storage cellars. The building externally is faced with Portland stone, which experts believe to be the same bed as the stone for the Banqueting House. Care has been taken not to interfere with the main lines of Inigo Jones's work. Internally the walls have been lined with Parian cement painted a cream colour, the enrichments to doors and windows harmonising with the style of the exterior and contrasting well with dark mahogany woodwork. Many of the fire-places have been brought from the old Institution in Whitehall-yard, which was designed by Sir John Vanbrugh as a residence for himself. These are good specimens of their age. The architects for all the works are Messrs. Aston Webb and Ingress Bell, and the total cost has been about 25,000*l*. Illustrations of the new buildings were published in this journal, under date May 13 and September 16, 1893. The façade of the new building is a very graceful piece of architectural design in itself, but we have some doubt whether it might not have been a better scheme to have carried on the cornices and order of the Banqueting House on the same scale, making a break in the line of front and modifying the details a little, so as to avoid any appearance of an attempt to confound new work with old. The whole effect would have been more homogeneous. As it is, we have two façades on different scales, forming parts of what is now practically one building. It is a point, however, on which there is no doubt room for difference of opinion.

AT the last meeting of the Berlin Archaeological Society an account was given by Herr Pomtow of the excavations at Delphi. From the report issued in the *Berliner Philologische Wochenschrift* of January 26 we extract some particulars so far as they relate to the main topic of interest—*i.e.*, the great temple of Apollo. It cannot be said that the results are so far encouraging. The platform on which the temple is built has now been almost completely laid bare, and, with the exception of the northern angle, still covered with *débris*, the excavators have dug right down to the living rock. No single fragment of the metopes or frieze, not so much as a "little finger" of the pediment figures, has come to light, and scarcely a single characteristic architectural fragment. The conclusion is almost inevitable that the temple was at some time or another systematically robbed of its sculptured decorations. As Pausanias saw and briefly described (x. 19, 4) the pediment groups, M. Homolle conjectures, not unnaturally, that the despoiler was some emperor of later date. Herr Pomtow reminds us that there was at Constantinople a hall called *Delphæ*, in which "the Delphic columns" stood, and though this primarily, perhaps, refers to the great serpent column, it is quite possible that Constantine the Great played the part of Lord Elgin to the temple marbles in general. Another important though negative result has been arrived at. Herodotus (v. 62) expressly states that the "Alcmaeonidae" being wealthy men made the façade of the temple of Parian marble instead of as originally intended of ordinary poros stone. With the exception of one triglyph discovered 2 in. down in the foundations no fragment of this Parian restoration has been found, and of the unfinished tufa capitals found no single one can, as regards the form of either abacus or echinus, be referred to a time as early as the sixth century, *B.C.* M. Homolle concludes and supports his view by various inscriptions that there was another much later restoration of the temple unnoted by any literary author and not known to Pausanias. Pausanias believed himself to be examining the temple designed by Spintaros (x. 5, 13). The ground-plan of the temple cannot yet be determined, the intercolumnal spaces even, and as yet, the number of the columns remain uncertain. It must be remembered, however, that there is still hope at the northern angle, the more so, as it was a piece of the *northern side* of the cella-wall that Ulrich saw above ground on his third visit to Delphi in 1841. The main point established is the exact position of the *adyton*. This must be placed not as has often been conjectured in the opisthodomos but in the very middle of the cella itself. The pavement is here intercepted by a broad, deep depression, the walls of which are of good masonry, carefully finished, evidently intended to be visible. The hollow is at present filled with a miscellaneous collection of all manner of fragments—of vases, of statues, blocks of tufa, &c. When these are sifted and examined, important data may be looked for. The underground chambers reveal a complicated network of spaces, two metres high, intersected by corridors. There is no means of approach by steps—they are empty, and bear no trace of having been used for human occupation. M. Homolle considers that the myth of "underground treasures" must be entirely abandoned. More details are promised shortly.

THE German Emperor has notified his intention of erecting a number of monuments to the Princes of Brandenburg, commencing with Margrave Albert, and ending with King William I. Room is to be found for them in the Avenue of Victory, which is one of the main approaches to the new Houses of Parliament. The cost will be defrayed from the Emperor's privy purse, and the monuments

are to become the property of the Municipality of Berlin. The occasion for this gift was the Emperor's birthday, on Saturday last. It is novel indeed to find royalty augmenting the usual birthday honours list, in which the names of artists so seldom appear, by a present of sculpture which will at least find work for a large number of this body, and will be an exceedingly popular kind of thank-offering on the occasion. Berlin citizens are very proud of their town; public monuments are much appreciated; and a row of sculptured monuments in one of Berlin's finest avenues will atone for much. One is, however, curious to learn whether the commissions for the work are reserved for court favourites only.

IN the course of a conference on "Conciliation and Arbitration in Industrial Disputes," at the Toynbee Hall, on Tuesday, Mr. F. Maddison paid a high tribute to the value of existing conciliation boards, and to that connected with the London building trades in particular. This was spoken of as a pattern to be copied by other industries desiring to establish a practical system for dealing successfully with trade disputes. The folly and futility of strikes become increasingly apparent both at home and abroad, and many a dispute can be pointed to in which the adoption of conciliatory suggestions at the outset would have resulted in gain to both parties, the apparent success achieved by the victors being entirely discounted by the losses involved. In addition to this, the injury done to the body politic is, as Mr. Maddison pointed out, simply incalculable. Obstinate refusal to submit to arbitration—whether on the part of employers or employed—is to be deprecated; but the non-existence of suitable machinery for conciliation is sometimes partly accountable for this attitude. A complete system of conciliation boards would certainly render it less frequent and more reprehensible. The question of legislation upon this subject is a very difficult one, but there can be no doubt as to the desirability of putting some well-considered scheme into practical shape without loss of time in those industries in which no provision is yet made for this most sensible method of dealing with trade disputes.

THAT the heating of a London theatre by electricity should have become an accomplished fact has taken engineers by surprise. Messrs. Crompton & Co. have to be congratulated on the success of their arrangements for heating the Vaudeville. They employ four large radiators, which can easily be carried about and placed where required. The County Council allow no door between the stage-door and the stage, hence the stalls are often in a bath of cold air, although the upper parts of the house may be uncomfortably warm. Radiators placed in the stalls during the daytime and removed to the sides in the evening are found very efficient; the freedom from danger and the ease with which the temperature can be regulated being great advantages. The total cost is under 2*s.* an hour. Eventually, heating-plates will be placed along the skirting of the walls with suitable gratings in front of them. It is expected that these, with the portable radiators, will be sufficient to warm the theatre in the coldest weather. In special cases, heating by electricity can be employed with manifest advantage, although heating with steam, by means of the radiator system, is generally far cheaper. It certainly does not give the same scope to the architect for inventing beautiful and novel effects.

MESSRS. MACEVOY & HOLT are not disposed to admit the inertness of coarse cement-grains. They have replied to Mr. Redgrave in the *Times*, and to Mr. Bamber in *Engineering*, and in both cases they mention again the experiments to which they had alluded in their letter of January 7.

They do not see, apparently, that the *three* tests on which they base their opinion are not enough to throw discredit on the conclusions at which many engineers have, after hundreds of experiments, arrived. Even if it be allowed that Mr. Bamber over-stated his case when he said that the residue on "a 180-mesh sieve . . . is no better than so much sand, if as good," it does not follow that Messrs. Macevoy & Holt's statement is any nearer the truth. And their sarcastic references to Mr. Redgrave's pertinent question (whether in their experiments "the coarse particles of cement were really freed from all flour by careful washing?") were quite uncalled for, seeing that Mr. Redgrave did not mean washing in water, as they seemed to think, but in benzine or other liquid "not liable to set up any cement action." All this talk about the inertness of coarse grains is, however, beside the mark; the real issue is the effect of ragstone on Portland cement, and this is clearly kept in view by Mr. J. L. Spoor in his letter to last Friday's *Engineering*. He gives an interesting table of tests made "years ago . . . by an unbiased expert"; among which are the following:—

Age in days	7	28	90	365
Neat Portland cement	lbs. 732	lbs. 805	lbs. 826	lbs. 826
1 part cement + 3 sand	109	253	337	359
90 parts cement + 10 fine sand				
+ 300 standard sand	133	217	316	320
90 parts cement + 10 limestone				
+ 300 standard sand	154	296	311	311

These experiments go to show that limestone [Mr. Spoor does not say how finely it was ground] added to cement, is a source of weakness, although its enfeebling effect is not as great as that of fine sand. Mr. D. B. Butler's letter is also to the point, and tends to corroborate Messrs. Macevoy & Holt's statement made at the Cannon-street meeting. Samples of cement, containing a considerable addition of Kentish rag, "which have"—to use Mr. Butler's own words—"reached me for testing in the ordinary course, compare favourably with average English cements when tested with three-parts of standard sand. I have also found in the course of my experiments, that an admixture of Kentish rag tends to make the mortar cohere better during the operation of filling the moulds, and if a more compact briquette is thus obtained, a higher tensile strain would naturally result. This may perhaps account, to some extent, for the improved results claimed by Messrs. Macevoy & Holt." It is to be hoped that the question will soon be settled by the report of the Cement Section of the London Chamber of Commerce.

THE Municipal Buildings, Perth, of which the greater part, with the valuable contents, were destroyed by fire last week, were built about fifteen years ago, from the designs of Messrs. A. & A. Heiton, of that city. The elevations were faced with freestone from Bonfield Quarry, in Fife, the internal stonework being from the local Huntingtower Quarries. Erected, at a cost of about 11,000*l.*, on the site of the old Council Chambers and some adjoining property acquired by the Police Commissioners, and having frontages to Tay- and High-streets, the block comprised offices for the Police, the Registrar, and the City Chamberlain on the ground floor; and on the first floor a council-chamber, 41 ft. by 25 ft., a burgh court-room, 30 ft. by 22 ft., and the Burgh-Assessor's office. It is stated that the flames broke out in an overheated flue, and that some portraits and busts, with all the town maps and plans, have been consumed. Perth received a municipal constitution forty years ago, and was made a city in 1880. We published a view of the Municipal Buildings, with a plan of their first floor, on September 25, 1890.

CANALETTO'S painting of the interior of the Rotunda, at Ranelagh Gardens, Chelsea, has just been purchased for our

national collection. It is one of the three pictures he is known to have painted of Ranelagh, and was engraved by N. Parr in 1751. The view is of intrinsic interest, as it depicts the original orchestra (octagonal on plan, and supporting the flat roof), after its conversion for a fireplace, and the later orchestra which, with the organ, was built over one of the four entrances. The Rotunda was built for Wm. Crispe and Jas. Myonet by William Jones, architect to the East India Company. With an exterior diameter of 185 ft., it had a rusticated arcade on the ground floor, and over that a gallery, with a roof sloping to the clearstory. There were four entrances, in the Doric style, their pediments rising to the base of the top story. The interior diameter was 150 ft.; forty-eight open boxes—Walpole calls them "little ale houses"—stood around the ground level, over them was a gallery, and above that the clearstory, lighted by sixty round-headed windows. The flat ceiling, coved at its edge, was groined over each of the windows and the eight sides of the central orchestra which rose in two stages. Canaletto shows each "box" fitted with a table and chandelier, two circles of large chandeliers suspended from the roof, a sounding-board over the orchestra, and plain wooden benches, without backs, for the visitors. The Gardens had belonged to the house which Richard, first Earl of Ranelagh, and Paymaster-General to the Forces, designed and built for himself, 1690, by Chelsea Hospital, he having obtained from the Crown two leases of about 23 acres, at a total rent of 45*l.* 11*s.* 6*d.* per annum, which in 1698 was exchanged for a grant in fee at an annual rent of 5*l.* An Act of 1730 vested the estate in trustees; three years later the house and grounds were disposed of in lots; two builders, Timbrell and Swift, bought the greater portion for 3,200*l.*, and gave a lease to Lacy, patentee of Drury-lane Theatre, and Solomon Rietti, who proposed to convert the garden into a kind of winter Vauxhall. They abandoned their project; Myonet and Crispe, lessees, revived it, and opened the Rotunda on April 5, 1742. Walpole writes to Mann in that year, "The building and disposition of the Gardens cost 16,000*l.*" The "Etna" stood to the south, in that part which was watered by a lake and a canal fed by the Westbourn. Ranelagh reached the acme of its fame in the interval 1775–85, during the patronage of the Duchess of Ancaster and Georgiana, Duchess of Devonshire; Dr. Burney was organist in 1760; on June 29, 1764, Mozart performed some of his own pieces on the organ and the harpsichord; in May, 1767, the Catch Club gave their first entertainment, for which Arne composed the choral and instrumental music. Their popularity having waned, the Gardens were finally closed on September 9, 1803 (*teste* Diprose), and the buildings having been pulled down in the following year were acquired by the Government for an extension of the hospital grounds. The organ, by Byfield (1746), was removed to Tetbury Church, co. Gloucester. The "Old Men's-ground," south-east of the pensioners' grave-yard, represents the old Gardens; the centre of the Rotunda stood over a spot that lies 350 yds. due north from the riverside end of the broad walk leading to the central front, which faces south-east, of Chelsea Hospital. Ranelagh House, afterwards connected with the Rotunda by a covered way, is drawn in La Cave's "Perspective View of the Amphitheatrical Building . . . to be erected at Chelsea, designed by Wm. Jones, archit., 1748." That view seems to be a design for altering, or rebuilding, the original structure; it shows the central orchestra rising by a lantern and cupola through a large circular opening in the roof, and the latter raised by a further story. La Cave had engraved Jones's adopted designs in 1742.

As we have repeatedly commented, in very decided language, upon the

unjust and illiberal conditions often offered to competing architects, we have pleasure in calling attention to the terms of the competition for the Technical Institute and Public Library for West Ham, as advertised on another page of this issue. The Council offer three large premiums (250*l.*, 150*l.*, and 100*l.*), and they state that the architect to whom the first premium is awarded will be engaged to carry out the building on terms in accordance with the Institute Schedule of Professional Practice and Charges of Architects. A deposit of one guinea is to be made on application for a copy of the instructions, but this will be returned on the return of the documents within a month, if the applicant decides not to compete; so that, while the deposit is sufficient to prevent applications from idle curiosity, architects are given the opportunity of inspecting the instructions without irrevocably forfeiting the deposit fee. The most important point, however, is the recognition of the right, which we have insisted on for years, of the first premiated architect to be paid his full commission for carrying out the building, in addition to and apart from the amount of the premium. His claim to this ought to be obvious, inasmuch as the competition drawings are extra work, and can never be used as working drawings; but this is almost the first time we have seen it practically admitted in an important competition. It is to be hoped that, the example having been once given, it will now be followed in other cases. The Council of the County Borough of West Ham, who are the promoters of the competition, have appointed Mr. MacVicar Anderson as assessor.

LETTER FROM PARIS.

It seems highly probable that the preparations for the 1000 Exhibition will cause, in two or three years, the demolition of the Palais de l'Industrie; the selection of the design by M. Hénard for one of the three first premiums seems to indicate a decided move in that direction, of which no one will complain except the "Société des Artistes Français," which for several years will be in some difficulty as to the location of its annual salon.

M. Bouvard, the architectural director of the future Exhibition, is commencing the study of a definite scheme, which will consist of a kind of selection of the best points of the various premiated designs; and it is probable that the site of the Palais de l'Industrie will be occupied by a large avenue, nearly at right-angles to the Champs Elysées, opening towards the Esplanade des Invalides, and having the dome of the Invalides as the close of its perspective. This avenue, crossing the Seine on a wide bridge planted with trees, will recall to old Parisians the former Carré Marigny, where, up to 1853, before the building of the Palais de l'Industrie, military reviews alternated with public fêtes. This transformation will add much to the effect of the grand promenade, at present encumbered with so many varied erections. According to this plan moreover—which is not yet finally adopted—the Palais de l'Industrie will not altogether disappear—it will only change its direction and its architectural disposition. Instead of being parallel with the Champs Elysées, it will be at right-angles with it, having its principal façade along the new road, on the site at present occupied by the "Palais de Glace" and the "Jardin de Paris."

The Municipal Pavilion on the Champ de Mars will also probably disappear, and the Municipal Council, which will be expected to make a large contribution to the exhibition funds, will obtain instead a monumental building, also on the line of the new avenue, and forming a pendant to the reformed Palais de l'Industrie. Here the Municipal Administration will be able to arrange its artistic collections under much better conditions as to space, comfort, and security, than in the Pavillon de la Ville, that last remnant of the Exhibition of 1878.

One result will be that until the new arrangements are complete the Pavillon de la Ville will only be used as far as is necessary: while at the Califfa Museum, on the other hand, everything is being done that can be done, and it will probably be open to the public in a few months.

The view and the plan of this museum have already been published in the *Builder* (Jan. 6, 1894).

since then the building and its internal decoration have been completely finished. In the entrance vestibule, where there is to be a bust of the generous donor, the smaller works in marbles have been arranged.

From this we enter a large gallery, in which are already placed the finest tapestries belonging to the city. Large glazed cases, which will themselves be objects of art, designed by some of our best sculptors, will contain vases, enamels, pottery work, wrought-iron and pewter work, &c., purchased from the annual salons. In an adjoining gallery the public will be able to see, for the first time, a fine collection of stained-glass windows of the twelfth and thirteenth centuries, besides cartoons for windows, bearing the signatures of Bessard, Lerolle, and Hippolyte Flandrin. Another large gallery will be devoted to Gobelin tapestry, marbles, and ceramics. In other adjoining rooms will be collected the medals, old engravings, and smaller objects of art, with which the collection will, year by year, be enriched. The square in front of the building will itself serve as an additional museum of contemporary sculpture.

This evening (Saturday) the first grand ball of the year will take place at the Hôtel de Ville, and will form a sort of inauguration of M. Puvion de Chavannes' decorations of the grand staircase. This decoration, of clear but subdued colour, with rather a predominance of blue, harmonises perfectly with the white stonework and lights up well under the electric light. It is a real repose for the eye after the eccentric performances in the adjoining rooms, where artists of essentially different temperaments and opposite talents seem to do battle with each other without the slightest consideration for unity of decorative effect. Two new marble statues are to be seen, which complete the sculptural decoration of the state dining-room. One, by Chapu, represents "Le Blé," and was left unfinished by the lamented artist; it has been completed under the direction of M. Paul Dubois. The other is the work of M. Dalou, and represents "La Chanson." There are further decorations to be carried out. M. Roll is at present completing an immense composition, intended for the entrance-hall opposite to that which has been decorated by M. Puvion de Chavannes. M. Jules Chéret is to have a whole room next to the Salon de Caryatides turned over to him, in which he intends to paint the principal characters of Italian and French comedy; M. Forain is to paint scenes of every-day life in the Council refreshment-room; and in the "Salon Diplomatique" it is proposed to have over the mantel a large allegorical bas-relief representing the City of Paris, surrounded by figures symbolising Instruction, "Assistance Publique," the Arts, and the Sciences.

Two small exhibitions have opened. That of the Cercle Volney comprises about 200 pictures and some busts; and though it is not therefore an important exhibition, it contains some works worth mention. Portraits are the most numerous class of works, those by M. Carolus Duran and M. Benjamin Constant being the principal attractions, or M. Bonnat's portrait of Dr. Labbé is, in our thinking, superior to any of them. M. Bouguereau's "Baïgonne" will add little to his reputation. Two pictures by M. Olivier Merson, "Chant du Soir" and "Les Disciples d'Emmaüs," are worth notice for their quality of sentiment; M. Luminais' "Pirates Normands," an Eastern scene by M. Pasini, and "Dunes Flamandes," by M. Tattetgrain, have also special interest. Among the sculpture we need only mention M. Boncher's "La Réve" and a bust by M. Puech.

The "Aquarellistes" have also opened their seventeenth annual exhibition at the Georges Petit Gallery. They do not make any progress, and the former exhibitions were superior to the present one. They show mainly a collection of miniatures, laboriously finished with the point of the brush. M. Lhermitte is a happy exception, his washed drawings (rather than water-colours) are fine and broad in style. M. Rochegrosse, who is always in the path of eccentricities, has been endeavouring to give extra effect to his drawings by a system of singular metallic-looking reflected lights. The hand of M. Harpignies, in his landscapes, is not enfeebled by age, and landscape art is also well represented in the works of MM. Paul Lecomte, Luigi Loir, Gaston Sébaste, Yon, and Zuber. When we have mentioned also the cats of M. Lambert, the soldiers of M. Worms, the sea-pieces of M. Courant, and the eternal cardinals of M. Vibert, we have sufficiently indicated the general character of the exhibition.

We may mention also an exhibition of water-

colours by M. Gaston Guignard in the Rue Caumartin; that of the pupils of the Atelier Cormon at the Durand Ruel Gallery, and that of the drawings and etchings of M. Van Rysselberghe at the same gallery.

A new sculpture-room, to be called the Coisevox Gallery, has been opened at the Louvre, adjoining the Puget Gallery. A certain number of works of the seventeenth century are there collected, which offer great interest to the student of French sculpture, showing its development during the little-known period from the end of the sixteenth century to the time of Louis XIV. Many of these works were already in the Louvre, but M. Courajod, the curator, thought they should be shown in a better light; others came from Versailles and from other State repositories less known to the public. We are thus able partly to reconstitute, in the Louvre, the former museum got together by Alfred Lenoir, of works saved from the vandalism of the Revolution.

M. Rollard, the sculptor, has been commissioned to restore the groups of sculpture in stone which decorate the tower of the church of La Trinité. These groups, the work of Maillet, Crank, Cavelier, and Carpeaux, have long been in a state which made them a danger to the public, and attention ought to have been directed years ago to their preservation; but in anything that concerns a church the Municipality of Paris show a systematic indifference. The statues on the tower of St. Germain l'Auxerrois, which are in a dilapidated state, are also to be taken in hand shortly.

At the Ecole des Beaux-Arts MM. Bernier, Thierry, de Gisors, Lalou, Lambert, and Esquié, have been appointed as the supplementary jury to decide on the next competition in architecture for the Prix de Rome. The Caylus prize in sculpture (for the best study in expression of a head) has been awarded to M. Auban, pupil of M. Falguière.

THE ADVANCEMENT OF ARCHITECTURE.*

BY PROFESSOR AITCHISON, A.R.A.

IN my two former courses on the Advancement of Architecture I treated of the benefits Architecture conferred on the people at large, by its power of stimulating thought and of raising various powerful emotions. I drew attention to the sort of immortality architectural monuments gave to a country, and how such monuments, when genuine, presented us with a gauge of the acquirements, knowledge, skill, and aspirations of the people at the time they were built; and I also mentioned the lessons such monuments might possibly give to future ages. I pointed out how desirable it was that architects should endeavour to give to their works the flavour of the age in which they live, which could not be properly given if their works were essentially copies of the works of former ages or of different climes. I gave you some suggestions of how I thought some of that flavour might be given by making buildings more exactly fitted to their uses, by the greater scientific knowledge exhibited in their construction, and by architecturally expressing the uses to which the buildings were put. I told you that architects created organisms in emulation of Nature, and that they should emulate her in giving the proper character to each building; that to express the true character of each building, rather than to produce beauty, should be the architect's aim, for beauty was appropriate only to certain classes of buildings, while the proper character was to every class and to every building. I also said that the impressions made on us by the insides of buildings were largely due to their lighting. That all the architectural decoration of buildings, beyond their shape and openings, was given by mouldings. I hope I impressed on your minds that mouldings must be as carefully studied for their effect in this misty and sunless climate as the Greek mouldings were for a clear air and a brilliant sun, at least, if we were ambitious of rivaling Greek excellence. And I finally told you what additional character and human interest could be given to buildings by the sculptor's, the statuary's,† and the painter's art.

Pure architecture is music without words, and the figure-groups of the sculptor or the painter supply the words. I may add that the painter, besides giving us his conceptions like the sculptor and the statuary, gives us colour too, for he is pre-eminently the master of colour. Our buildings are not only perfected by colour, but can

also be greatly helped by it to express their proper character, that is, by the keys of colour used; for different emotions are evoked by the key being light, delicate, gorgeous, sombre, or funereal.

Few persons think that the products of such fine arts as sculpture, painting, music, and literature are self-created, or are even created by those who pay for them; but this is not the case with architecture; its products are mostly written of as if they made themselves, or were designed by the occupiers. The assumption that buildings designed themselves provoked that retort from the wit that "Architecture was the last stronghold of spontaneous generation."

The architectural students know too well that an architectural work is no more self-created than a statue, a picture, an oratorio, or a poem, but that it is the outcome of the thought and personal effort of one who has mastered the teaching of former buildings. As Chaucer says:—

"For out of the old fieldes, as men saithe,
Cometh all this new corne from yere to yere;
And out of olde bookes, in good faith,
Cometh all this new science that men lere."[‡]

Almost every one of the fine arts pre-supposes a taste for it in the people, for as the first office of a fine art is to impress or to delight, why should it be produced if it does not? The artists who produce it expect money, honour, or fame, and hope to get all three. I said almost every one of the fine arts, for I did not include architecture, for this fine art apparently gives no delight to the present generation, and produces neither money nor honour, but we hope it may ensure fame. This statement may seem a paradox, for architects are paid. Architecture, however, is not a pure fine art, but is a useful art as well. And the fine art is inseparably bound up with the building as the soul with the body. The fine art of sound is called music, the fine art of architecture is aesthetics, but as architecture is so often used in opposition to building as the *fine art*, I suppose I had better conform to the modern usage, and music can no more exist without sound than architecture can without building. People above the lowest savages must have buildings for shelter, for privacy, and for defence, and that part is paid for, but the architect gives the fine art. I may say, by the way, that architecture never will be thought anything of until it is highly paid for; in the present day, at least, the value of everything is what it will fetch: yet the giving away the fine art will not defraud the architects of fame, should posterity think their works are worthy of fame. These lectures, however, are given in the hope of putting you in the way of getting Fame's good graces, and not those of Plutus. No one would deny that Milton had got a crown of fame, and yet, as Mark Pattison said, he was paid the price of waste-paper for his "Paradise Lost."

Many known factors go to the production of fine architecture, and probably many that are unknown. There must be accumulated wealth, and a desire to expend it on buildings for use, for state, or for the expression of gratitude or adoration, and, as a rule, it is only for the last purposes that the noblest and finest architecture has been produced; there must be great skill in the workmen for the fashioning of the various materials required; there must be science, knowledge, ingenuity and skill amongst the architects, by whatever name they may be called; and they must be animated, too, by a desire to embody the aspirations or ideals of the time: these aspirations pervade society, just as electricity pervades the air. There must be, too, a feeling of delight and gratitude in the people when they see any approach, even the faintest, to the embodiment of their ideal. This ideal, too, must persist for several generations with but slight variation, but with a strong desire for its perfect realisation.

We may look upon the particular ideal of the time as a plant that at first just peeps above the ground, gradually reaches its full growth, blossoms, seeds, and then fades away. The teaching of each successive generation of architects must be founded on the immediate past, though this teaching may be so modified by the study of work done even thousands of years before, that the new architecture may have little apparent affinity with the immediate past. The architects who are embodying this ideal when it is in progress must have mastered the knowledge and skill that has carried it so far, and by study, effort, and genius must keep pace with it.

Of whatever else we may be ignorant, we

* Being the first Royal Academy Lecture on Architecture this Session. Delivered on Monday evening last, Jan. 28.
† A statuary is a worker in bronze.

* "Assembly of Fables." (We believe the authenticity of this poem is questioned by Chaucer scholars, but it probably belongs to his time.—Ed.)
‡ Lere—i.e., learn.

cannot be ignorant of this persistence of an ideal, for architecture has shown this persistence in all its great epochs. We see it in Greek architecture, in Roman, in Byzantine, in Saracenic, in Romanesque, and in Gothic.

No one can doubt that we have accumulated wealth, that we have most skilful workmen, architects learned in all the architecture that has preceded them, and striving to embody their own ideals; for every day we see something new that surprises us, and we occasionally see some unostentatious little building that shows a mastery of delicate proportion.

One of our great wants is a National ideal that can be expressed by building, or an ideal common to Christendom tinged with national peculiarities: another want is an efficient desire to have it expressed: -Gothic is an instance of the embodiment of an ideal common to such races as had embraced Latin Christianity, with the exception of that doorway to the Maristan of Kalaan at Cairo, which we suppose was like a piece of Indian or Saracenic work imbedded as a curiosity in a modern European building. This age not only has a passion for science, but an admiration and respect for it: for besides what the applications of science have done for us materially, there is a belief that science will eventually unfold for us all the mysteries of Nature. The age, too, has been characterised by a passion for exploration, and this passion has not only succeeded in settling questions that had perplexed mankind for thousands of years, but has led to the colonisation of a large part of Africa; and has thus freed Europe from the vague terror of being subjugated by the blacks. This exploration has mainly been done by Englishmen, I might almost say wholly, as the names of Park, Bruce, Beak, Baker, Speke, Livingstone, and Stanley will testify. The cause of the rise of the Nile was the problem I spoke of, and it has been definitely settled as due to the fall of rain in the higher parts. This solution has always been suspected, although Herodotus rejected it. Besides the exploration of the Dark Continent, some of the nations of Europe have tried to arrive at the North Pole, and when this has been reached the South Pole will probably be explored before we have the next flood.

There are, too, visions of many Utopias in the air—the Utopia of universal learning, of universal peace, of moderate labour, plenty and leisure for all; and the democratic Utopia. I do not think there is any Utopia of virtue now in the air, and, as far as I know, there is no modern moral philosophy. This is curious, as everyone must know that nations only come to predominance through virtue, and sink into oblivion when they lose it. The Medieval Utopia of virtue was theological.

The one great social achievement of the day in England has been universal compulsory teaching, and nothing has been so full of promise since the abolition of the monastery schools. When a chemist wants to get substances to combine, he makes solutions of them, and mixes the solutions, and then the molecules that love each other the most, combine. The youthful humanity in the Board School somewhat resemble these solutions, for the school, with its varied studies, gives the youth of both sexes the chance of taking up with the useful study or occupation he or she likes best, and when there are endowments for perfecting those that show aptitude, we shall have the talents of the country properly trained and applied. No one can doubt that this would be a great advantage both to the country and the individual; it would, in fact, be the carrying out of Napoleon's axiom, "the tools to those who can use them."

There is, however, one important subject that has been overlooked in the Board School teaching, the systematic exercise of the children of both sexes under trained teachers: by systematic I mean that every muscle in their bodies should be daily put in action. If this were done, it would make a stronger, healthier, and a finer race; not to speak of its importance to the bulk of the children, who will have to get their living by hard work. It was the universal practice of gymnastic that made the Greeks so fine in form, and it was mainly from the Greek statues of the winners at the games, that our ideals of human beauty have been formed.

Aristotle tells us that from the Lacedæmonians being the first to practise gymnastic, they were superior to all other people, and then says:—"This pre-eminence was due not to their disciplining their youth in this severe manner, but solely to their giving them a course of training, while other nations did not."

As to universal peace, that is a dream that

Nature gives no countenance to, for fighting and destruction are her means of preserving the best, and getting rid of the worthless. Tennyson put this very well. He says, man trusted that love was

"Creation's final law—

Tho' Nature, red in tooth and claw,
With ravine, shriek'd against his creed."

—"In Memoriam," c. 55, v. 4.)

To have congenial work that fully occupies the mind and does not exhaust, to have plenty and leisure for exercise and delight, is our vision of Elysium; we should certainly try to approximate this earth to Elysium when we can, and as nearly as we can; but as the population increases, and there is less and less margin in the means of subsistence, we shall at least have to give the whole day and our whole strength for a day's meal.

Democracy is another splendid vision, for what can be so desirable as that every ratcatcher, lumper,* and knife-grinder should have his full share of wisdom, courage, temperance, and justice, and that his patriotism should be as great as that of the best and the highest in the land; without these virtues Democracy, in its proper sense, can hardly exist, and certainly cannot last. I say Democracy in its proper sense—that is, government by the whole people, and not, as the word is misapplied, to describe that part of the population which works only with its hands. To hope for a good and lasting Democracy is, I fear, the triumph of hope over experience. We see, in Plato's Republic a visionary attempt to obviate the monstrous evils of Athenian democracy, so bitterly satirised by Aristophanes in "The Knights," and you must recollect that Plato's Demos, or body of voters, excluded most of those that worked with their hands, for these were mainly slaves.

I think it is Pausanias who says that the Athenian republic was the only democracy that ever improved its condition, and Athenian supremacy only lasted from the battle of Plataea 479, to that of Chæroneia 338 B.C., some 140 years, while the Roman aristocratic republic lasted 361 years, from the burning of Rome by the Gauls, till the founding of a despotism by Augustus, and 357 years from then till the removal of the Metropolis to Byzantium, in all 718 years, and then the Eastern Empire lasted 1,123 years longer, till it was extinguished by Mahomet II. in 1453.

You may possibly ask yourselves what these matters have to do with architecture? They have this to do with it, that before we can try to embody ideals we must know what they are; and then, as architects, we must ask ourselves if such ideals can be expressed by building; if they cannot, we must see if the buildings devoted to that end, can be so carved or painted as to make clear the ideal they were built to illustrate. I think that abstract ideas can only be suggested by the use of symbols and emblems. The need of both is now mostly overlooked, and if not overlooked is ridiculed; yet without them how can abstract ideas be represented? Antiquity and the Middle Ages were pervaded by symbolism, and their works were full of emblems; and I do not see how it could have been otherwise. If it was ever necessary to have symbolism, emblems, and emblematic figures to express abstract ideas in buildings or in figures, how can we dispense with them now, if the same lessons are to be taught? We generally do without these lessons now, because those in power foolishly think the lessons taught by the visual fine arts are of little consequence, or are not wanted. How could Hercules be distinguished from an athlete without his club and lion's skin, Neptune without his trident, Bacchus without his leopard, vine-leaves, and thyrsus, or Juno without her peacock? Could we recognise the figures of the Evangelists without their emblems? In Gothic buildings symbolism was universally adopted, if we may believe Durandus; and even now there are the remnants of former symbolism in our minds, for we all recognise the symbol of the Cross in cathedral plans, and of the spire, as pointing the way to heaven.

We want to express the higher ideals in buildings that are to be used for high ideal purposes, and to express them so that the multitude may recognise them. How can they be expressed without symbolism? Plain buildings show three things outside: firstly, the mechanical devices for keeping out the weather and for the protection of the structure; and thirdly, by their shape and openings, they suggest something of their internal

use. Inside, buildings tell much the same tale, but we may perhaps make a better guess at their uses, by the quantity and position of the light admitted. Every building should have some touch of fine art about it, not only because it is made by man for man, but also because it takes from all, light, air, and prospect.

It seems to me that all architectural buildings can effect without symbolism, is to raise certain emotions, and when architects know how to raise such emotions in their buildings, they must know that these emotions are not unsuited to the destination of the buildings. I hope to show in a future lecture how the art of raising emotions may be learnt.

Probably there are two great master ideas in the present day, the idea of liberty as a means and the pursuit of truth as an end. I think Aristotle defines liberty as the absence of an outside power, tending to prevent us doing what we believe to be right, and Plato defines a Tyrant as one who endeavours to get rid of the good people in a state, and keep the bad. To say the least, it would be difficult to build anything that could express either of these complex ideas.

Supposing a building to Liberty were wanted, the architect who had to design such a building must know how it was to be used, whether it was to be a temple for the worship of Liberty, a hall for lectures on its advantages, or a mausoleum in honour of those who had secured it for their nation. If the former, then there must be a ritual, and the architect must know what that ritual was, whether there were to be priests and a high-priest, and how these priests would group themselves and what they were to do, and how the worshippers were to express their adoration. He would want to know whether his building was to accommodate a few persons or multitudes, whether it was to be simple, stern, or magnificent, whether it was to be light or gloomy, whether it was to soar to heaven or to grovel on the earth, whether it was to inspire awe, admiration, love; but I must confess that I do not see how he is to make it show its particular object unless the forms and features had a symbolic significance. A spire is now the sign of a building devoted to divine worship as a dome once was, and as the circular niche now is in Moslem buildings. But even with architectural symbolism it would be hard to express the idea of Liberty by a purely architectural building without figures, or to hold up for imitation its most important phases; to do that the architect must, I think, have recourse to the sculptor and the painter. What could the sculptor and painter do to embody this ideal? and then, as architects, we must ask ourselves if such an ideal can be expressed by building? and so, is Liberty to be represented as a man or woman? and what symbolism is to be used to ensure that the worshippers know that it is the statue of Liberty? Or what emblems are to be given to the statue to express its attributes? Sculpture, plain or coloured, would be needed to give a history of the evils and the evils show the advantages of liberty and the evils show the want of it, to give a history of its good effects at various epochs, and of its intolerable evils when it was degraded into licence. I know that in the Middle Ages at least, they were recognised emblematic figures of the cardinal virtues and of the deadly sins, and that all arts and sciences were emblematically shown that beholders could read the meaning. I mean the ideals of liberty and the pursuit of truth to show the difficulty of expressing abstract thought by building, if it had the recognised symbolism attached to it; even with the assistance of the painter and sculptor. I insist on this: that you must have some one or two, to be made clear to the public by building before you can enlist the sympathies of the gifted men, and fire them with ambitious design buildings worthy of such ideas; for to be able to design such buildings, not only presupposes genius, but that they have striven through long laborious years to acquire the necessary skill. You may be sure that the Athenians had adequate motive to perfect themselves in designing their temples, when they believed in the deities, and particularly the Virgin Goddess, had just saved them from the dreaded Persians.

We see, too, how they embodied their ideal the temple was a glorified house with a side or double verandah all round it; while architectural detail was treated by a choice of the simplest and most exquisite forms, which the sun played melodies from dawn to dark; the composition of lines was unapproachably perfect, and the destination of the temple was proclaimed by sculpture; that of the Parthenon portraying the birth and achievement

* A labourer who does not work by the hour, but moves merchandise at so much for the lump.

the Goddess and of the honours paid to her at Athens; the whole composition of architecture and sculpture together attaining sublimity.

The Saracens had an adequate motive for thanking Allah, who through his servant Mahmud, had welded all the hostile tribes of herdsman and robbers into a nation; had changed their idolatry into a monotheistic worship; and had given them the world to conquer and to pillage. The Saracens, however, were destitute of arts, sciences, and learning when they left Arabia, and time was wanted for them to acquire knowledge and to create a style.

When that knowledge was acquired, their style almost necessarily took a marked geometrical direction; for the image of no living thing was allowed in their temples, lest they should relapse into idolatry. Their style culminated in geometrical ceilings, cornices, and patterns, of almost superhuman skill and of maddening complexity.

You may be equally sure that the Medievals had an adequate motive for building their temples in the best and most perfect way, to honour those saints who had enabled them to win the Holy City for the Cross, and to conquer the hated Saracens.

Jerusalem was won in 1099, and held for nearly a century.

The Crusaders, during their stay in the East and their intercourse with the Saracens, imbibed, we suppose, some of their learning, and some of their passion for geometry, and finding they were inferior in civilisation to their enemies, tried at home to rival the Saracen monuments.

However it may be regarded, it is beyond question that Gothic emerged about a century after Jerusalem was taken, and rapidly progressed until it was killed by contact with the Renaissance. We must never forget that the whole period of the Middle Ages in Europe was saturated with Arabic lore. All that was known of the Greek geometry and philosophy, and to a great extent of the Greek authors, was through Latin translations of the Arabic versions made by Jews. Up to 1700, a translation of Averroes' "Great Commentary on Aristotle" was used in the Italian universities; although the Italians had reconquered Greek in the fifteenth century. The Renaissance was another great architectural epoch mainly due to a new ideal. The Italians had, through their classical studies, been led to mentally break their ecclesiastical fetters; fetters that had condemned their minds to sterility, and their bodies to asceticism. Their new freedom enabled them to investigate nature, and prompted them to try to equal the masterpieces of antiquity. Unhappily, in architecture, they were too much taken with the size and magnificence of their ancestor's buildings to think of aught but imitation, particularly as they were not constructors, and had produced no style of their own; in spite, however, of this unhappy state of mind, we must never forget that the Italians, and when I speak of Italians I mean Tuscans and Umbrians, had a passion for every possible form of beauty.

I may seem to have dwelt too much on the embodiment of national ideals, but I believe it has exerted a great influence on all the developments of architecture. We cannot even look at the remains of ancient Rome without feeling that there was a striving after an ideal grandeur and dignity. We are so apt to look on architecture as a mere conquering of the difficulties of arrangement, of construction, and of rendering the whole agreeable to the eye, that we are apt to think these points are all that is necessary for true architecture, forgetting that it has a soul; but it is the very absence of this that has made modern architecture so different from that of the past, and so little relished. Balzac, in one of his episodes, speaks of sculpture, and says it is not difficult to make a statue of a man, but to breathe into it the breath of life requires the efforts of a man of genius.

I wish to point out that though enthusiasm will work wonders, by giving mankind almost superhuman strength, it will not work miracles; it would not enable a thirteenth or early fourteenth-century artist to draw figures like Masaccio, Raphael, or Michelangelo; it would not enable a man to be a first-rate performer on a musical instrument who had never tried to play. A man must master the elements of what is known in his profession before he can endow his work with his own personal likings, much less can he, without that knowledge and skill, impart to it the impalpable ideals of his time.

We want to realise the highest aspirations of society in our buildings if architecture is to rise

to its due height, or else it will remain but a sort of transcendental mechanic's work. I think architects are learning the way to put all their thoughts and emotions into their work.

The inspired votaries of each of the fine arts would probably tell you that they embody all their thoughts and emotions in their works; musicians certainly tell you so. In Romanesque, and even in Gothic architecture, there is something of the mystery and turmoil of the thoughts of those days, for though there was a certain Renaissance of learning and knowledge, the passion for over-running new countries, for plunder, fire-raising, and slaughter was still seething in their blood, and was a dominant motive for the Crusades. The first Crusaders had seen strange sights, their hopes and fears had been excited in perilous journeys through unknown lands, in combating hunger, thirst, hardship, and disease, in fighting with the all-conquering Saracens, and all these emotions had culminated in the glory of having again won Jerusalem for Christian worship. You must remember, too, that society was then perpetually being thrilled by its profound belief in the delights and horrors of another world. I have tried to roughly sketch some of the surroundings of the men of that day, and from among the men of that day came the artists. I want you now to comprehend one of the necessary conditions for the artists being able to embody their thoughts and aspirations in their work. Whether these artists were poets, painters, sculptors, musicians, or architects, they must have had the mechanism of their art at their fingers' ends, for without that there was no possibility of embodying in their work the varied knowledge they had, nor the tumultuous emotions that possessed them. Such a mastery over the mechanical part of any fine art can perhaps but rarely occur, but without it the embodiment of ideals cannot take place. This mastery occurred in Athens after the Persian war, among the Saracens after their conquests and the creation of a style, in Christendom after the early Crusades, and in Italy at the Renaissance.

I do not compare the present turmoil of knowledge, invention and discovery, of hopes and fears, of visions and aspirations, with those of the Crusades; for multitudes have not now suffered the hardships and horrors of the early Crusaders, nor has Europe conquered the conquerors; but short of this, the wonders that we have become acquainted with, are much greater than those that ever presented themselves to mankind before. This age of ours ushers a new Renaissance in most branches of knowledge. The application of electricity and steam to machinery has not only multiplied our powers of execution a thousand-fold, but with the discoveries in chemistry has created for us wonders that outstrip the imagination of the poets. Men are pursuing enquiries on a new basis; they are trying to find out the history of the creation of our universe, the growth of worlds, the composition of the ether, what life is, and how it originates, what electricity is, and what force is, and how both come to be transmutable from heat to motion, or from motion to heat; why the wind blows with varying force at certain times, and in certain directions; why rain falls unequally, why eruptions, storms, and earthquakes arise, and how gravity is transmitted. A new science of invisibles has been started, and it is found that organisms, invisible to the naked eye, pervade all life, and that certain of them are as necessary to its continuance as some are fatal, and we have to a great extent, learnt how to avoid pestilence and famine. There are new investigations of what is virtue and what is vice; new theories on the proper organisation of society; investigations of how the earth, man, and animals came to their present state; how man acquired and perfected speech; how he came to his beliefs, and how they progressed.

All this is not without its struggles and conflicts between the thousand shades of knowledge, feeling, and desire; from those who think this the best possible of all possible worlds, to the madmen, who, in the hopes that a better condition of things will spontaneously arise, would tear up and destroy everything.

If you students are to be the architects to deal with this turmoil architecturally—and if you are not, who are to be?—it is necessary that you should have all the mechanical part of architecture at your fingers' ends, and by the mechanical part I mean that part that can be taught, for at present Nature alone produces genius, and to us it appears in a haphazard way; this, however, is merely through our ignorance, for without doubt she follows unvarying laws, as in every other case that has been investigated. Let us hope that some day the perfecting of man will have

the same attraction for philosophers as the perfecting of sporting dogs or of racing horses, of sheep that cannot leap, or of pigs that will fatten; and then we may look for the gradual development of a superior race.

The business before us, however, is to deal with what we have, and to see if there is any way by which the breath of life can be breathed into our architecture. I think there is a vigorous vitality in the atoms, whose products are the architecture of the day. We may be thankful, too, that there is perfect architectural liberty, though at present this liberty has produced nothing but chaos; we want to find out the power that will cause all these atoms to coalesce into one organised whole, so that the forces that now cause simple divergence, may produce instead continuous progression. I must not, however, conceal from you, that there are distinguished architects who say that this chaos is not only useful, but should be a cause of pride; for that genius, knowledge, and skill can now be shown in a hundred different ways instead of only in one. That we can have paraphrases of Egyptian, Assyrian, Persian, Greek, Roman, Romanesque, Saracenic, Gothic, and the different phases of Renaissance, besides Chinese, Burmese, Siamese, Japanese, and Indian architecture. I by no means deny the possibility of erecting buildings with certain fine quantities in any of these deceased or living styles. Hundreds of such exist in the world, but I look upon them as being the shame rather than the glory of Christendom. Such buildings can never, in my opinion, be perfectly logical, since in construction alone they must be behind the present knowledge or must pretend to be, for many of the modern long stone architraves are merely tied up to iron beams: nor can such buildings be the exponents of the taste, thoughts, and aspirations of the day. I think if such boasts be not a defence of their authors' own paraphrases, and a tacit regret that they were unable to invest their buildings with the expression of the day; they must take a different, and what is in my opinion, a lower, view of architecture than I take. I desire to see architecture representing the greatest knowledge, skill, and taste that exists, as well as the highest aspirations of the day, so far as these thoughts and aspirations can be expressed by building. I look on the paraphrases of former styles as merely the exercises of artists to acquire the mastery of their art. I think, too, that the best architects of the day are rather ashamed of this chaos of paraphrases, and would be the first to hail any real progress with delight. It is true that anything new must be founded on something, for nothing in this world springs full grown and armed, like Minerva from Jupiter's brain, but as yet a true forward movement is not visible to our eyes, though it may be in the course of formation.

There are as yet no buildings called for, that demand the fullest powers of architects, nor their greatest striving to embody the highest aspirations of the time; most of the new buildings are for more or less commonplace uses, or are buildings for a jumble of uses, and such buildings must necessarily lack that unity of purpose which the finest buildings ought to possess. It has been often said "that religion is the mother of architecture," but the religion of this latter part of the nineteenth century, has certainly not yet excited the passionate enthusiasm of mankind.

Although I admit, with grief, that there is at present very little liking for architecture in England; I am half inclined to believe that this want of appreciation is partly due to this, that no one has yet embodied in his buildings the aspirations of the day, so as to take the public by storm. In spite of Dr. Johnson's opinion, which he put rather coarsely, I hold that the artist, be he poet, painter, sculptor, musician, or architect, is very nearly the tailor of other men's thoughts; he is the genius that can express, depict, portray, or embody the vague desires and aspirations of the people of his day. If you put this the reverse way, I do not see how it can be doubted. The difference of the present aspirations from those of the past, make it impossible for any persons but antiquaries to relish reproductions, in the way that the higher aspirations of the present would be relished; and could some superhuman architectural genius portray the aspirations of some future time, say those of only a hundred years hence, how is it possible that we could fully sympathise with them, when our surroundings are so different? For—

"I doubt not thro' the ages one increasing purpose runs,
And the thoughts of men are widen'd with the
process of the suns."

—Tennyson, "Locksley Hall."

* "Averrois d'el' gran comento feo."
(Iante, "Inf." c. 4 l. 41)

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS:

THE LEGAL POSITION OF ARCHITECTS IN RELATION TO CERTIFICATES AND AWARDS.

The seventh ordinary general meeting of the present session of this Institute took place on Monday last, at 9, Conduit-street, Mr. Aston Webb, vice-President, in the chair.

Mr. W. H. White (Secretary), announced the decease of Mr. Edward Graham Paley (Fellow), of Lancaster.

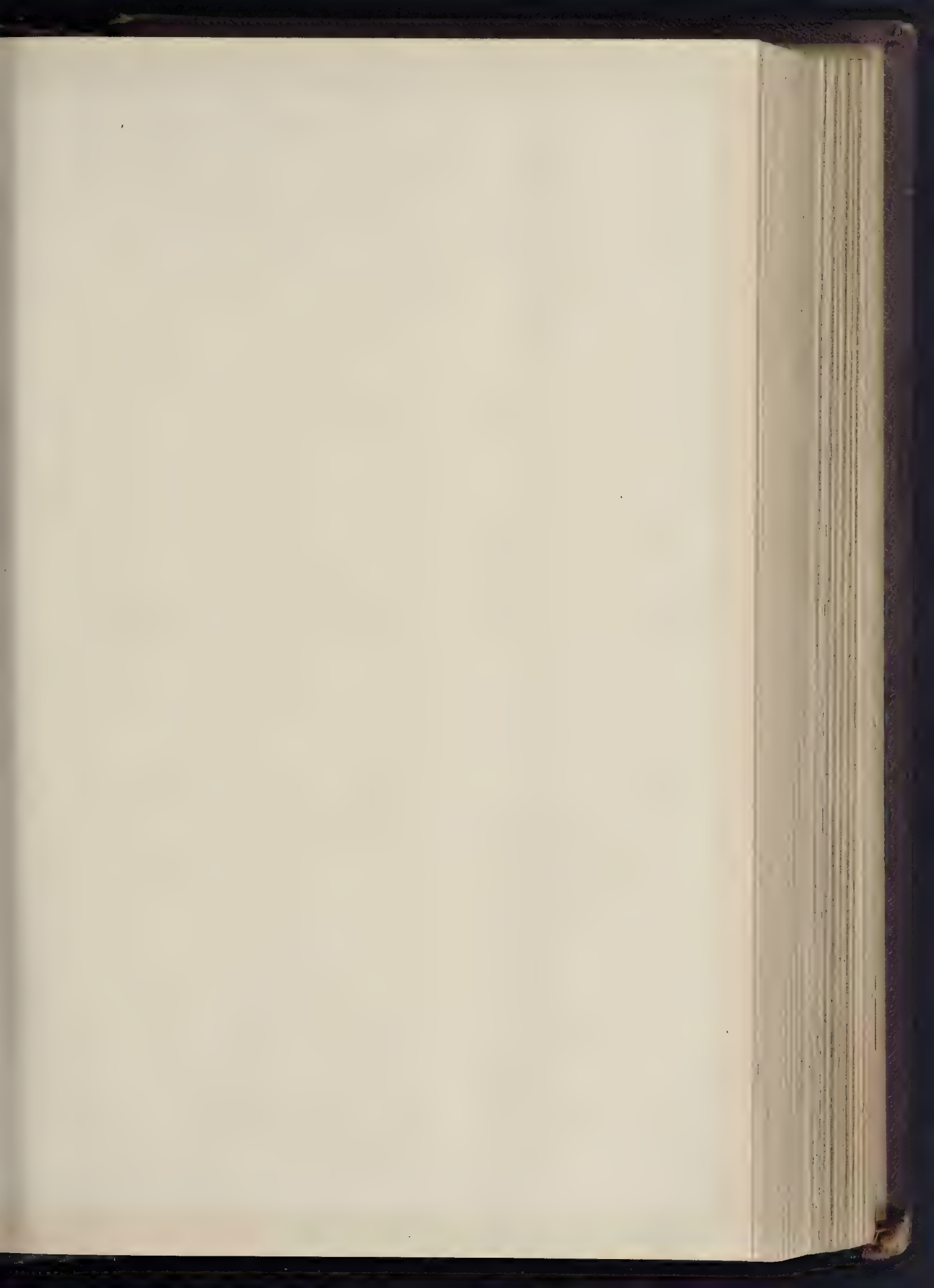
Mr. J. A. Strahan, M.A., J.L.B., Barrister-at-Law, then read a paper on "The legal position of Architects in relation to Certificates and Awards," of which the following is an abstract.

In contracts for works, which were especially liable to give rise to many petty differences between the parties to them, the need of a mode of settling or preventing disputes certainly and without litigation was early felt. Two such modes suggested themselves. The first consisted in making it a condition of the contract that before the contractor had any legal claim for payment against the employer, he must carry out the contract to the satisfaction of some given person. The second consisted in making all differences between the contractor and employer referable for consideration and settlement to a third person. The first mode might be called settlement by certificate; the second, settlement by arbitration. In order that a certificate might settle anything, the granting of it must be made by the contract a condition precedent to any right of action on the part of the contractor. And even when a certificate was made a condition precedent, certificates given during the execution of the works—progress certificates—settled nothing but the legal right of the contractor to claim the amount certified in them. They did not constitute an approval of the work done, nor prevent a subsequent revision of the payment made under them. An arbitration might be and frequently was made a condition precedent to any right of action on the part of the contractor; but this was not necessary to render an arbitration an effective settlement. The award of an arbitrator duly appointed was equally conclusive of the matters referred to him whether it was or was not a condition precedent that there should be an arbitration before any action would lie against the employer. In contracts for works the certifier was almost invariably the architect in charge of the works, though this was not legally a necessity: if the contract provided that the employer himself should be the certifier in point of law there would be no objection. Usually the arbitrator—if the contract contained a reference clause—was an architect. Of late it had become common to specify as arbitrator the architect in charge of the works. At first, this practice was regarded as of doubtful legality, as to a certain extent making the architect a judge in his own cause. Recent decisions had dissipated this doubt. The settlement of disputes arising out of building contracts having become one of the commonest duties of an architect, it was important that he should clearly realise his legal position and liabilities in the matter. The position of the architect varied enormously, accordingly as he acted as a certifier or as an arbitrator. The cardinal distinction between arbitration on the one hand and certification or valuation on the other was, that the former was a judicial inquiry, while the latter was simply work done by the architect under his contract with the employer. Accordingly, an architect acting as an arbitrator was a quasi-judge, and as such his legal duty was towards the public generally; while an architect acting as a certifier was merely the skilled servant of the employer, and as such his legal duty was towards his employer. This difference was clearly recognised by the law in the powers which it gave the court, which could remove an arbitrator from his office, but could not remove a certifier from his. It could, under certain circumstances, appoint a new arbitrator; it could not under any circumstances appoint a new certifier. In granting certificates the architect was entitled to proceed in whatever manner he pleased. He was not bound to hear both or either of the parties. In conducting arbitrations, on the other hand, he must proceed in judicial method; he must give both parties to the arbitration fair notice of the date and place of meeting, and must hear the parties or their counsel in a reasonable manner and to a reasonable extent. In granting certificates the architect was not bound to be impartial in the sense of not having any settled view upon the matter in question before it actually came before him for decision, or in the sense of being free from all influences, such as personal interest in the decision, which were likely to pervert one's

judgment. The court would examine into nothing save the *bona fides* of the architect in certifying or refusing his certificate. In conducting an arbitration, an architect must be impartial, not only in the sense of not being consciously unfair, but he must be impartial also in the sense of not having any settled view upon the matter in dispute before it came to be decided by him, and in the additional sense of being free from all influences likely to pervert his judgment. This rule, however, was considerably modified in cases where the decision of all disputes by the award of an arbitrator not to be subsequently appointed but there and then specified, was one of the conditions of the contract between the employer and the contractor. In such a case the specified arbitrator, while bound not to entertain any concluded view on the matter in dispute until he had heard both sides, was not rendered unfit to be an arbitrator by the fact that he was not free from certain influences likely to pervert his judgment. This modification applied chiefly, but not exclusively, to cases where the person appointed by the contract to be referee in all disputes arising out of the contract was the architect or engineer of the employer. Such references were, as had already been said, formerly regarded with dislike by the court as making the architect judge in his own cause; but of late the leaning of the Court had been in the opposite direction. It held now that such a reference was good and must be enforced against the contractor, provided the latter knew at the time he agreed to it that the architect in question was the architect to the employer, that nothing which might not reasonably have been anticipated by the parties had happened since the appointment, likely to pervert the arbitrator's judgment, and that there was no evidence that before the parties had been heard the arbitrator had formed a fixed and unshakable opinion on the merits of the dispute. This was exemplified by the circumstances of the case of "Jackson v. Barry Railway Co." It must, however, be remembered that the principle exemplified in this case applied only to matters which were known, or which might reasonably have been anticipated, by the parties at the time the building contract was entered into. On no point was the difference in the status of the architect, according as he was granting certificates or conducting a reference, more marked or more important than in the matter of personal liability. In granting certificates he acted as the skilled servant of the employer, and accordingly was liable to the employer for any damage to the latter which might arise from his negligence or want of skill in granting them. It was true no amount of negligence and no want of skill would render the certificate, once granted, the less binding on the employer. In the words of Mr. Justice Willes in "Goodyear v. Mayor of Weymouth," 35 L.J.C.P. 12 [1865], "If you employ an architect who does not know his business, and who certifies that he is satisfied when he ought not to express satisfaction, you must be bound by his mistake." To the contractor, on the other hand, the architect, in granting certificates or in refusing them, owed no duty whatever save that of general one of common honesty. No want of skill and no amount of negligence on his part, however disastrous this might prove to his party, would render the architect liable in damages to the contractor. In granting certificates, then, the architect was liable for want of skill, negligence, or fraud in respect to the employer, and for fraud only in respect to the contractor. In conducting arbitrations, on the other hand, the architect, whether acting as sole arbitrator by agreement between the parties or under the direction of the Court, or whether acting as a joint arbitrator, the representative of one of the parties to the arbitration, was a quasi-judge, and as such he was not the servant of anyone, and was not liable to anyone for negligence or want of skill, however gross. His award was not as binding on the parties as a certificate. It might be set aside for other things than fraud—for mistakes in law or fact appearing on its face, for instance, for want of finality, for misconduct in conducting the arbitration, or because further evidence had arisen since the close of the proceedings. But in conducting the proceedings and in making the award, the architect acted in a judicial capacity, and accordingly, like other judges, he was personally liable, not for negligence or want of skill, but for fraud and for fraud alone. From the point of view of the architect, settlement by certificate had the enormous advantage that it left him master of the situation. He was entitled to decide every dispute finally and conclusively by his mere *ipse dixit*. On the other hand, it had the disadvantage that if he neg-

ligently certified for what he should not certify, he might find himself mulcted by his employer in an action for heavy damages. Settlement by award, from the architect's point of view, varied very greatly according as the arbitrator to decide disputes was the architect himself or a third person specified. In the former case he remained nearly as much master of the situation as in the case of settlement by certificate; in the latter case the only advantage accruing to the architect in charge of the works was that he was relieved of the somewhat invidious duty of deciding on what was virtually his own dispute. From the contractor's point of view, settlement by certificate had, beyond its certainty and cheapness, little but disadvantage. It placed him absolutely at the mercy of the architect; though it was to the credit of the profession that contractors were so ready to confide the decision of disputes to the honour and honesty of the architect supervising the works. The advantages of settlement by award, from the contractor's point of view, depended on who the arbitrator was. If the architect in charge of the works, the contractor's position was practically the same as under settlement by certificate, except that before the dispute was decided he was entitled to be heard by the architect—a privilege which usually cost him as much as it was worth. If, however, the arbitrator was a third person, and more especially if he were not an experienced person, the contractor's position was a very pleasant one. He could harass the employer by making all sorts of allegations as to the conduct of the architect and the employer himself, and insisting on having all these investigated. Very often the mere threat of them was sufficient to induce the employer to come to an arrangement to the advantage of the contractor, and if the matters in dispute did come before the arbitrator, the contractor was pretty certain to get something. From the point of view of the employer, settlement by certificate was obviously the most advantageous mode of settlement. Settlement by award when the arbitrator was the employer's architect was, from the employer's point of view, much the same as settlement by certificate, except that it was more expensive, scarcely so conclusive, and the architect was not personally liable for mistakes. Settlement by the award of a third person, however, was as disadvantageous to the employer as it was advantageous to the contractor. It was harassing, extremely expensive, and very liable to be unjust to him in its result. Indeed, almost its only advantage over an action at law was that as a rule the award finally concluded the dispute.

The Chairman in inviting discussion, said they had had the most able and interesting paper from Mr. Strahan, on a subject of the greatest importance to architects, and which he thought came rather conveniently at a time when the Institute would probably before long be considering the revision of certain of the conditions of contract under which they at present worked. Professor Kerr had great pleasure in proposing a vote of thanks to Mr. Strahan for his able paper. The result of Mr. Strahan's reading of the paper must be to create a good deal of alarm. It was true that they were accused—and rightly accused—of frequently not understanding the law they had to deal with. But some of them might not have supposed it possible that they could misunderstand the law so much as the learned lecturer would seem to imply. However, the point he made from the position of the architect seemed to be this: that with the courts, as at present constituted—one could not answer for what might occur before very long, as they were always changing their minds on matters they did not understand—that the courts, as at present constituted, drew a marked distinction between the arbitrator and the valuer. That would be new to a good many architects. When the valuer, who in practice was generally the surveyor, delivered his decision after being properly appointed, that decision was not to be disturbed unless fraud could be suggested in some way or other. It was a different thing with the architect, who was giving a decision upon points which were not points of valuation, as between the employer and the employed. He would use the words which the lecturer had made use of, and say that, to the honour of the profession to which they belonged, it must be admitted that the decisions of architects were, as an almost universal rule, loyally given and loyally accepted. He had said before now that, but for the loyalty of the architect, it was scarcely easy to understand how many building contracts would be able to pull through at all. He believed that every architect, who was a member of the Institute, and who had heard the discussions which took place





THE ABBEYS OF GREAT

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NO. 9. TYNEMOUTH. (SEE PAGE 10.)

on such matters, did accept for himself the situation of an absolutely impartial judge between his own employer and the contractor. That was a very unusual condition of things, but a condition which existed to their very great honour. Not to dwell at any length upon the question, which the lecturer had so ably discussed, namely, the difference between the valuer and the arbitrator, let them not forget the favourable mode of deciding building disputes, which was adopted under the Building Act with regard to party-walls. The plan was this: there were no valuers or arbitrators, but each party to the dispute appointed his own agent, called his own surveyor. The two surveyors appointed a third, and any two of the three delivered the award. Now, from his experience in such matters, which had been considerable officially, he would say that no other mode of settling building disputes was comparable in the slightest degree to this, for facility and satisfactory administration. The great characteristic of that mode of settlement in building matters was this, that they got rid of the non-courageous mode of delivering a secret award. A man who gave his decision and retained his reasons was not a courageous man, and no judge on the bench ever did so. No judge belonging to the legal profession ever gave his decision but subject to an appeal, except in the case of the House of Lords. But when an architect or surveyor delivered his award, giving no explanation, and declining as a matter of rule to do so, it was a different thing. They got rid of that by the Building Act, and the *modus operandi* was this: When the original surveyors held diametrically opposite views, each doing the best for his clients, though not holding views which were excessively extravagant, when they met with a third man the whole matter was discussed. The third man gave his opinion, from time to time, as the others stated theirs, and the consequence was that there was an opening for compromise. In litigation there was no chance for this; one man was declared to be altogether right and the other to be altogether wrong, although the difference between them, as regards justice, was not equal to a finger's breadth. The tribunal of the three surveyors discussed the matter quietly, and the third surveyor, if he happened to take a peculiar view of the matter, was always open to argument. The consequence was, that when they had argued the matter out, and could not settle it, the third had to say: "I think we have discussed sufficiently, and my opinion is not shaken; I think we had better settle it." Then both parties were informed of what had taken place, and the result was that generally both sides were satisfied, whereas, by the system prevailing under the legal form, the probability was that both parties would be dissatisfied. With regard to the two capacities in which the lecturer had said the architect would find himself acting, Mr. Strahan must excuse him for saying that it was almost impossible for a layman to discuss it on the same ground as he did. They considered it unfair for the architect to be the absolute judge, without appeal, between his own employer and the builder. The lawyers might consider that fair, but architects did not, and, therefore, they had an arbitration clause, which, he understood, worked well, and which, he believed, would work a little better if the arbitrator were like the third surveyor. It was very good of Mr. Strahan to come and discuss such a subject, which he evidently understood exceedingly well.

Mr. Edwin T. Hall, in seconding the vote of thanks, said the attitude which the Institute had always taken up had been that the architect should take upon himself a judicial position. It must not be forgotten that, for one case of dispute they heard of, there were probably 999 contracts which had been concluded without any dispute whatever. That spoke strongly for what the lecturer had been good enough to refer to, viz., the honour of architects, and the readiness with which their decisions were accepted. Mr. Strahan had spoken of the architect as a certifier and as a referee, of settlement by certificate, and by award, and he had dwelt in a clear manner on the essential differences between the two positions. Professor Kerr had drawn attention to the fact that there was generally a third person, the valuer, and that rendered their duties simpler when they were acting as judges, whether by certificate or by award. The position of a judge of first instance was an important one, and the view generally held by the Institute was that the architect must of necessity occupy that position even though he was not the final referee. There should be someone to give a decision,

which could be appealed against, if necessary, and he should not be afraid to express his opinion just as a judge did in the courts, while they could go afterwards, if they so desired, to the referee to get their decision overturned. Professor Kerr had recommended as the best of all courts that which was prescribed by the Metropolitan Building Acts in party-wall disputes, but he would point out that, as a rule, the questions settled there were simpler, in the sense that there were not many points raised, whereas in an arbitration on a large contract there might be hundreds of points in dispute, and it would be almost impossible for any award to be made by two out of the three, where there was an arbitrator, with an architect on the one side and a builder on the other. If it were constituted as a court of three, consisting of an independent person, with a representative of the employer on the one side, and the builder on the other, it would be almost impossible for two of them to agree on an award, because on fifty points the arbitrator might agree with the employer, but on the other fifty he might agree with the builder. Their practice brought about the result in a somewhat different way. The architect on the one side, and the builder on the other, stated the case; the threads were gathered up by an independent arbitrator; and though he might agree with fifty points on the one side, and fifty on the other, his award settled all the matters in dispute. Thus, while there were three persons engaged in the matter, the decision rested with one of them. The question of the final certificate was a very important one. He believed the thing to do was not to give a final certificate except as a last one for money payment. If a certificate of completion were given and something was discovered which was very improper, the architect had probably taken upon himself the responsibility of relieving the builder from his liability, and he would be liable for an action by the employer for *laches*. That was the opinion given by very eminent counsel to the Royal Institute of British Architects, who advised that the architect was liable for *laches* to his employer. Therefore, the view they hoped shortly to submit to the Institute was that there should be no final certificate of completion, but that the builder should be left to the Statute of Limitations, and then there would be no liability on the part of the architect to the employer, while the builder would rightly take upon himself that responsibility which belonged to him. The Builders' Institute had agreed to that, and, therefore, in their new conditions the point would be laid before the members. No doubt everyone present approved of the arbitrator being an independent person, but that was not the practice of any of the big Corporations, their rule being that the architect of the building should be the final referee. That was the course, he believed, pursued by the Corporation of the City of London, by the Government, by the Asylums Board, and other large bodies, and he understood that, as a rule, it worked very well. Still, for ordinary contracts, it was not a view which this Institute had taken, and which they, as individual architects, had held. It must be fairer that an independent person should settle matters in dispute, because they were almost always in dispute between the architect and the builder.

Mr. William Woodward was surprised to hear the last part of Mr. Hall's remarks. He should have thought that at some period of an architect's history in connection with a building, he would have the courage and the honesty to have cleared the contractor from his responsibility. Mr. Woodward then referred to clauses 11 and 17 of the conditions of contract issued by the Institute, and contended that it must be unfair to the contractor to endeavour to insert in the new conditions the revision of the final certificate. The architect sometimes allowed too long a time between the granting of the final certificate and the completion of the work. If a wise man, he allowed at least twelve months, and even then he was not compelled to grant the final certificate, if he had any doubts as to defects of workmanship or material. With regard to the tribunal, there was a great deal in what Professor Kerr had said, and Mr. Hall had pointed out some of the little difficulties which would arise in the multitudinous matters which occurred in carrying out a building contract. To allow an architect to be the judge in his own case appeared to him to be a condition which it should be the endeavour of everybody to upset rather than to support. The builder should have every facility afforded him to open up causes of dispute, and should be protected from any oppression on the part of the architect. His advice to every contractor would be, knowing the

weakness of human nature, not to allow the architect of the job to be the sole arbitrator. The conditions issued by the Institute were quite sufficient for the protection of the architect, if carried out by a fair-minded man, and there would be no necessity for the clause which Mr. Hall had shadowed forth, and which he would do his humble best to set aside.

Professor Banister Fletcher remarked that he remembered two cases of the issue of final certificate, in connection with the London School Board, where the Board had, nevertheless, the right during four years to investigate the buildings. This was done at enormous loss, the schools being taken almost to pieces, and the result was that one builder gained the day, while the other builder lost it. He thought that illustration would show Mr. Hall that some one must take the responsibility off the shoulders of the builder at a reasonable time. On these grounds, Mr. Hall would doubtless see the wisdom of the architect taking his proper position. He did not believe that any profession had suffered so much as theirs for the want of understanding it in the case of the legal profession. The lecturer had spoken of the architects as being third parties to a dispute, and as being judges of their own causes. It was not so; the architect being simply appointed to see the particular contract carried out. With an honest and straightforward architect there should be no difficulty, and a good builder was also desirous that his reputation should not be lowered by the erection of a bad building. He thought it would be well if the Institute would endeavour to show lawyers what the exact position was, and endeavour to do away with the responsibility now put on the architect by the employer and by the lawyers.

Mr. William White, F.S.A., thought they should take into consideration the character of the builder, and provision must be made as against a good or a bad one. From a very considerable experience he was happy to say that he had had very few disputes, and in cases where disputes had occurred it had not been in connexion with the highest class of builders. In his contracts he inserted a clause that if any extras should arise the builder should give the particulars, and that by negotiation they should be settled as the work progressed. He had found this simplified matters wonderfully, although it had in some instances occasioned a considerable amount of additional labour.

Mr. T. M. Rickman said that in the earlier part of the paper he found certain matters stated, upon which he differed, as matters of fact, with the lecturer. One was as to the increasing habit of appointing the architect as the arbitrator on the work. He doubted whether that was the case. Then, again, there were one or two things on which it would be well for the younger members to think twice before they acted upon them. It seemed to him rather dangerous to point out that under certain circumstances no want of skill, or amount of negligence on their part, however disastrous to the contractor, would render the architect liable to him. It was more desirable indeed that the younger men should be advised to exercise all the care and skill possible. When he had read the paper through, however, he was perfectly satisfied that Mr. Strahan had drawn a fair conclusion from the various advantages and disadvantages in connexion with the two courses discussed by him. He had great pleasure in agreeing with what had fallen from Mr. Hall, on the subject of the final certificate. He believed, as a matter of fact, that the final certificate was seldom given. He had always considered that during the course of the contract the architect should have certain powers as regards materials, the mode of working, the order in which the work was to be done, and authority on other matters during its progress. All these matters too must be the subject of arbitration if disputes should arise. Then there was the question as to whether an arbitrator should be brought in during the early stages of the works. The certificate to be granted, the amount received, the value of the works executed, unfinished materials, and all the rest of it, when the building was one-half to two-thirds completed, were exceedingly difficult questions. In one instance with which he was acquainted, had the builder taken advantage of the award, and made use of the knowledge he could have gained therefrom in the middle of the work, he would have been saved from some of the consequences of bankruptcy, and the works would have been sooner completed. That was an instance in which it was necessary that there should be the opportunity of having an arbitration in the course of the works. As the lecturer had said, it was

of the greatest importance to clear the contract up, and to get the work done, and for that purpose the architect should have strong powers reposed in him.

Mr. C. H. Brodie considered that the architect was in a sense the servant of the employer, but directly the contract was signed that condition ceased, because he then had simply to see that certain things which were definitely formulated were carried out, and he could not, if he were a just man, be any longer the servant of the employer. Why their legal friends should be so fond of bringing out this phrase of the architect being the servant of the employer, he could not understand, because it was not quite just. As to the question of awards, there was another case in which members of the Institute were frequently called in to give an award, and that was in the case of competitions. In such cases, he would strongly commend Professor Kerr's words, that they should not be afraid in giving a decision, to state their reason for it.

The Chairman said they had had a very interesting discussion upon the paper. He had always considered that in all conditions of contract the architect was always made absolute, during the progress of the work, in regard to the question of materials, and the manner in which the work was executed. If that were not so he did not see how the work could ever be finished.

The vote of thanks was then put, and was very cordially received.

Mr. J. A. Strahan said there was not much left for him to reply to, because the criticisms made by each speaker seemed to have been answered by the next. For instance, Professor Kerr had instanced the practice under the Building Act as a perfect mode of deciding building disputes, but Mr. Hall had pointed out that it was not a very judicious method, and he agreed with what Mr. Hall said on that point. Again, Mr. Hall had objected strongly to certificates of completion, and had said that they should not be granted by the architect. As a matter of fact, he (the speaker) had not discussed the expediency of final certificates, but if he were to reply to Mr. Hall he should adopt what Mr. Woodward had said, viz., that there should be an end to the builder's liability within a reasonable time. At the same time, a certificate of completion did not mean that there should not be a period of maintenance. He considered that the architect took very little personal responsibility in connexion with such a certificate, he being liable only for negligence. In the case of a settlement, for example, he did not think any court would hold an architect liable if it took place four years after the date of the certificate. The Court was very reluctant indeed to hold an architect responsible for anything less than gross carelessness or gross incapacity, and if he granted a certificate carelessly it was only reasonable that he should be held responsible. He would like to point out that he had not come there for the purpose of stating what the law should be, but of stating what the law was. Lawyers were not makers of the law. Judges might, to a certain extent, make the law, but the barrister's function was simply to explain it. It had been said that an architect, when he had decided a point in dispute in a contract, was not a judge in his own cause. He might not be so morally, but lawyers were practical people, and when they found that an architect's reputation might depend on the decision of certain points which he himself was to decide, they were inclined to think he was a judge in his own cause. He would say, in reply to Mr. Brodie, that when the law applicable to architects was made, he was afraid the profession of an architect was not particularly in the minds of judges and legislators. It had been decided on the broad general principles of contract that if a contract was made with any man, he was bound to do his duty, and to discharge it skillfully and carefully. The law, therefore, regarding the architect as the paid servant of his employer, held him to be responsible for want of skill or care. The law drew a broad distinction between the architect acting as a certifier, and when he acted as an arbitrator. It was necessary to make the architect master of the situation until the works were completed; otherwise the works might be stopped for many months, and the whole contract be thrown into the utmost confusion.

Mr. Woodward asked if the Institute had been pledged in the slightest degree to the Conditions that they had been formulating.

Mr. Hall said that they had not. The builders had agreed that the clause should be recommended to the Institute for adoption.

The meeting then stood adjourned to Monday, the 11th prox., when papers will be read on "The Value of Simplicity in Architecture" by Mr. Halsey Ricardo, Mr. Basil Champneys, and Mr. Alma Tadema.

ARCHITECTURAL SOCIETIES.

BIRMINGHAM ARCHITECTURAL ASSOCIATION.—On the 25th ult., Mr. Horace R. Applebee, of London, read a paper upon "The Preparation of Drawings for the various Prizes offered each year by the Royal Institute of British Architects," illustrating his remarks with drawings kindly lent for the occasion by Messrs. W. H. Bidlake, Arthur Bolton, Geo. Kenyon, Frank Verity, and others. Mr. Applebee strongly urged all students under the prescribed age to enter for the competitions, as even, if unsuccessful, the time occupied was never thrown away. After the meeting, Mr. A. J. Dunn was entertained at supper by his fellow-students of the Association and School of Art to celebrate his success in gaining the Pugin Studentship.

CARDIFF, SOUTH WALES, AND MONMOUTHSHIRE ARCHITECTS' SOCIETY.—At a recent meeting of the Cardiff, South Wales, and Monmouthshire Architects' Society (the President, Mr. Bruce Vaughan, in the chair) the following memorial was ordered to be sent to the Cardiff Museum Committee:—"That the Cardiff, South Wales, and Monmouthshire Architects' Society memorialise the Cardiff Museum Committee to the following effect: That, unless they have already pledged themselves to any architect, they should invite a public competition for designs for the new museum buildings proposed to be erected in Park-place, the competition to be under the rules of the Royal Institute of British Architects."

CARLISLE ARCHITECTURAL, ENGINEERING AND SURVEYING SOCIETY.—A lecture was delivered before the members of this Society on the 23rd ult. in the Town Hall by Mr. S. W. B. Jack on "Some of Our Cathedrals." Commencing by stating that no country, in proportion to its size, was really so rich in examples of ecclesiastical architecture as England, the lecturer described the main features and history of the following cathedrals:—Exeter, Wells, Salisbury, Winchester, Canterbury, St. Paul's (an elevation also being shown of the former cathedral on the same site), Ely, Peterborough, Lichfield, Lincoln, Worcester, York, Durham, and Carlisle, ground-plans of Salisbury, Canterbury, St. Paul's, York, Lincoln, and Carlisle being also shown. Westminster Abbey and Beverley Minster were also described. The merits of the above cathedrals and noteworthy points as to style, special features, &c., were discussed by the lecturer, who illustrated his paper by a large series of limelight views, the lantern being manipulated by Mr. J. J. Gillies. A vote of thanks to Mr. Jack concluded the proceedings.

PLYMOUTH SCHOOL OF ART.—Mr. B. Priestley Shires, A.R.I.B.A., in the two opening lectures of the second session, concluded on the 24th ult., at the Plymouth School of Art, Princess-square, the history of Greek and Roman art, and then dealt with subsequent styles. As regarded Roman architecture, Mr. Shires said the early Romans possessed no style of their own, but borrowed their ideas of building, first from the Etruscans, and at a later period, the Greeks. But there was this to be remembered, that what she did borrow or take she reconstructed in accordance with her own spirit, converting the whole into realisations of grandeur and ostentation in response to the wants which arose from her conquests and wealth. Mr. Shires then proceeded to trace the rise and progress of Roman architecture, naming the principal works erected under the various Emperors down to Constantine, when the seat of the Empire was removed from the banks of the Tiber to the shores of the Bosphorus at Byzantium, A.D. 330. The lecturer laid particular importance to a clear understanding of the position architecture held at this period. Here ancient Roman art practically ended, and a new style at Byzantium was developed and practised through subsequent centuries up to the building of St. Sophia at Byzantium, the Constantinople of to-day, built in the latter half of the sixth century by Justinian. The next style developed, the lecturer said, was that of Romanesque, with its many offshoots in many lands, and that in our own country we know by the name of Norman architecture.

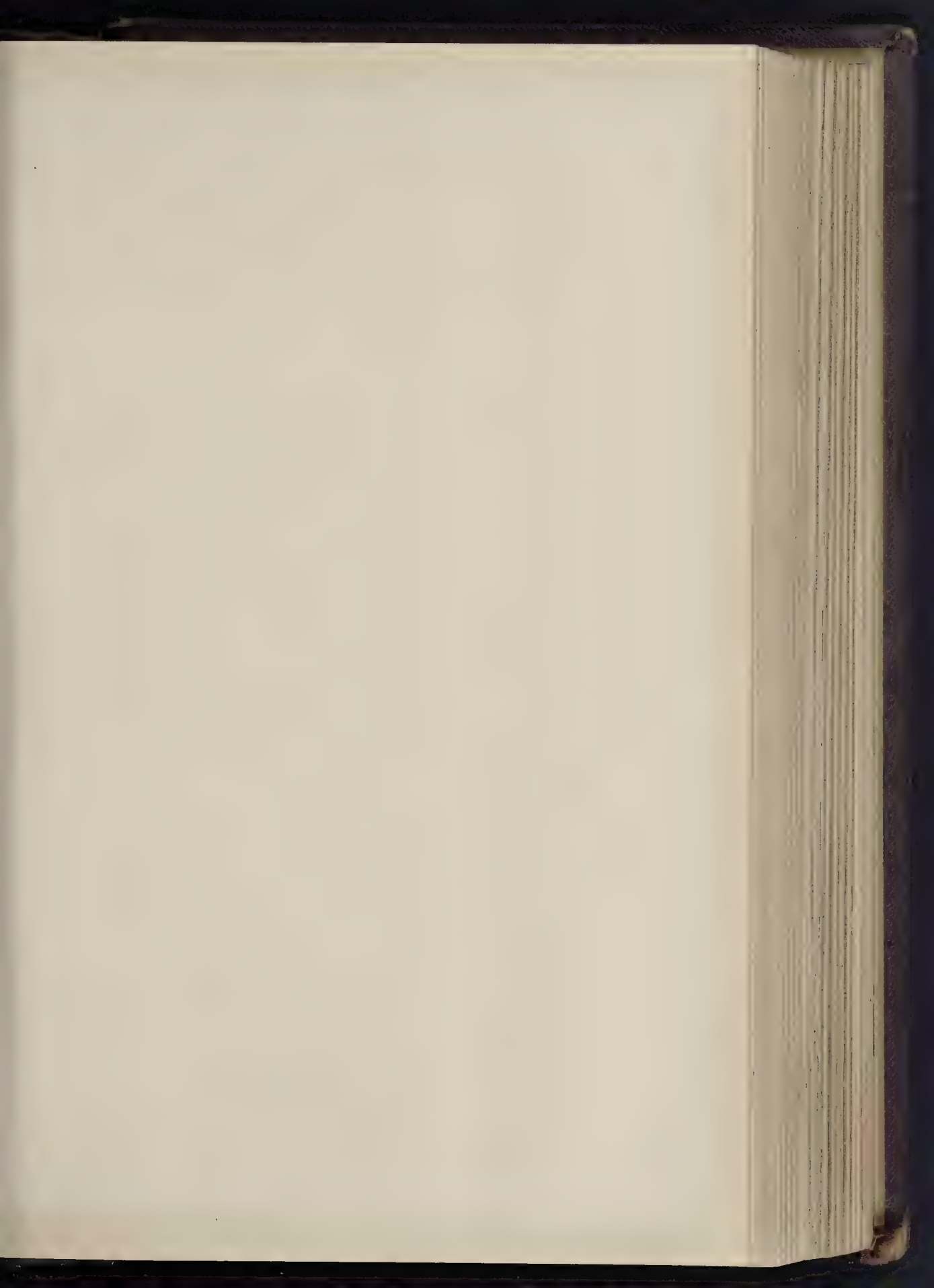
ENGINEERING SOCIETIES.

THE INSTITUTION OF JUNIOR ENGINEERS.—At the Westminster Palace Hotel, on the 26th ult., was held the tenth anniversary dinner of the Institution of Junior Engineers. Mr. Alexander Siemens, the President, occupied the chair. All the customary loyal and patriotic toasts had been duly honoured, the toast of "British Commerce" was next given by Mr. Wm. Powrie, who declared that engineers were probably more interested in the development and extension of commerce than any other body of men, and especially junior engineers, who would take a very important part in the progress of commerce. In the absence of Sir A. K. Rolitt, M.P., the toast was responded to by Mr. Spooner (Technical Instructor at the Polytechnic Institute). Mr. R. W. Newm, submitted the "Engineering Professors," remarking that the future training of engineers should be based upon a sound scientific ground, and upon the elementary education received at the average elementary schools. Professor Ayrt (Vice-President) replied. Professor Forbes, giving the toast of the evening, "Success to the Institution of Junior Engineers," said that the body fulfilled a very valuable function. There were few things in the training of an engineer that did him more good and helped him also in his work more than seeing what progress was being made in the profession. Incidentally Professor mentioned that each time he went to America it seemed to him that all his ideas, rules and principles of engineering had been revolutionised, for in the United States the methods working were wholly different, and when they felt that in England he had been getting in a groove and needed to be taken out of it. At the present time the society numbered no fewer than 400 members, and he congratulated them on the immense progress they had achieved in many directions since they came into existence. Mr. H. J. Young responded. The remaining toast included the "Absent Members," proposed by Mr. A. H. Dykes, and responded to by Mr. C. Roberts, and the health of the President, submitted by Mr. Beaumont, and acknowledged by the President.

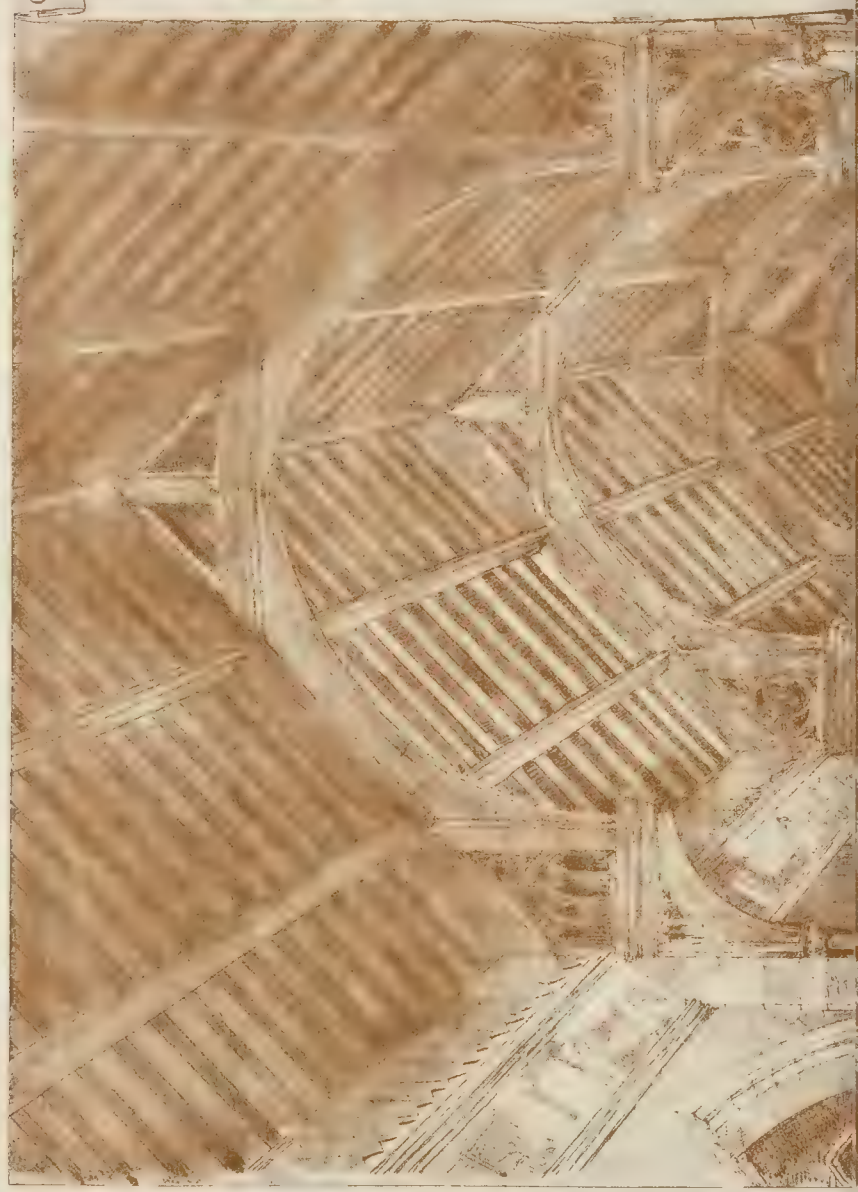
THE INSTITUTION OF CIVIL ENGINEERS. At the ordinary meeting of the Institution of Civil Engineers, held on the 29th ult., Mr. Wolfe Barry, C.B., Vice-President, in the chair the paper read was on "Boiler Explosions," by Mr. William H. Fowler, Wh. Sc., Assoc. M.Inst.C.E. The author referred briefly to theories, such as "deferred ebullition," "association of water," "spherical condition" which were propounded to account for such explosions. He showed that it was the steam, rather than the water, in the boiler which formed the source of destructive energy, and was a view to illustrate the amount of stored energy available in the event of explosions, pointed out that it was equivalent, in the case of a Lancashire boiler 8 ft. in diameter by 30 ft. in length, at a pressure of 150 lbs., to the work expended in lifting the structure to a height of nearly 3,500 ft., rough speaking equal to the explosion of 1,700 lbs. of gunpowder. In regard to the causes of boiler explosions, there was nothing occult or mysterious. They could, as a rule, be traced by patient investigation to the operation of simple and well-known facts. Thus when a boiler-shell was normally in a state of high tension, if once rupture took place by the action of static stress on a locally weak spot, the stored-up energy was capable, not only of tearing the boiler to pieces, but of producing all the other destructive effects observed in connexion with such disasters.

LIVERPOOL ENGINEERING SOCIETY.—At the meeting of the Liverpool Engineering Society the 23rd ult., a paper was read on "The Theory and Action of some Automatically Balanced Machinery" by Mr. W. Worby Beaumont, M.Inst.C.E., of London, by whom a new principle in applied mechanics is brought into use as a means of preventing the vibration commonly caused by many classes of reciprocating machines, and of converting into useful work the power usually wasted in setting up harmful vibration buildings.

CHURCH SCHOOLS, TEACHER'S RESIDENCE, & BURTON-ON-TRENT.—Mr. Hamar Bass, M.P., has given a site for and erected at his own cost a new school with residence, and restored the vicarage house at Christ Church, Needwood Forest, from the plans and under the directions of Mr. R. Carpenter, architect, of Burton. The builders of the whole of the works were Mr. Sharp, of Birtch and Mr. Mason and Mr. Turner, of Burton. The style of the school building is Classic, built in small red brick with stone dressings.



THE BUILDER FEBRUARY 2, 1895.

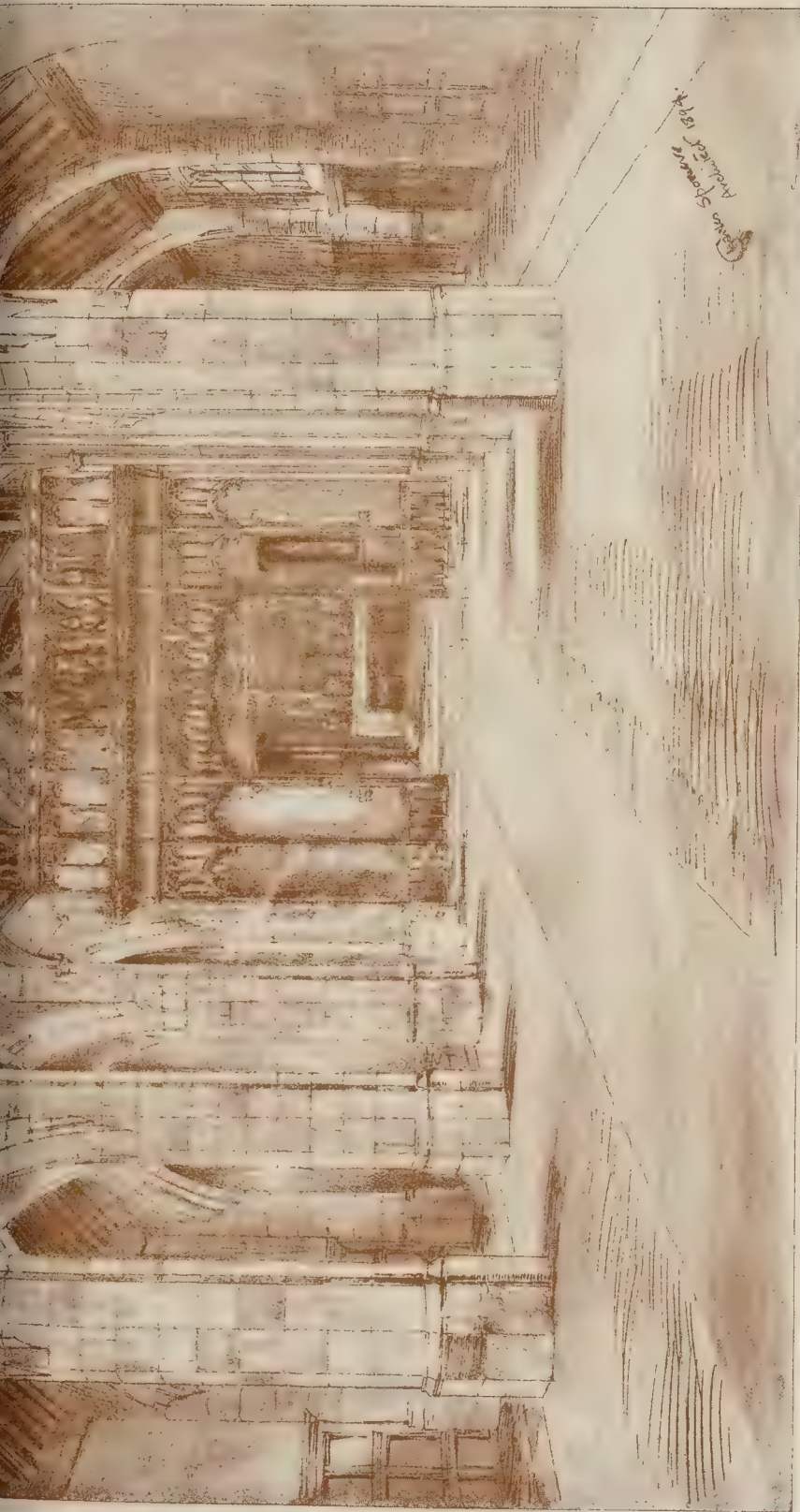


CHURCH OF ST BARTHOLOMEW,
IPSWICH.

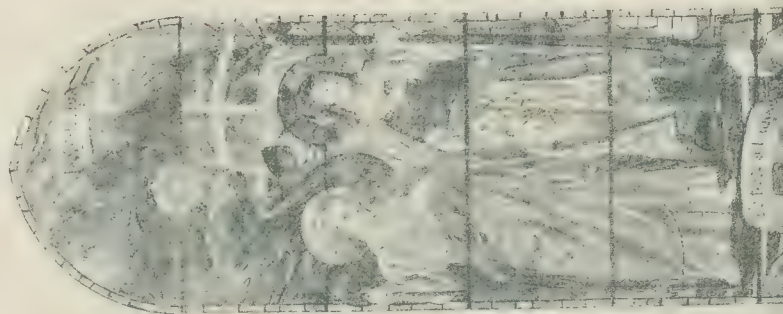
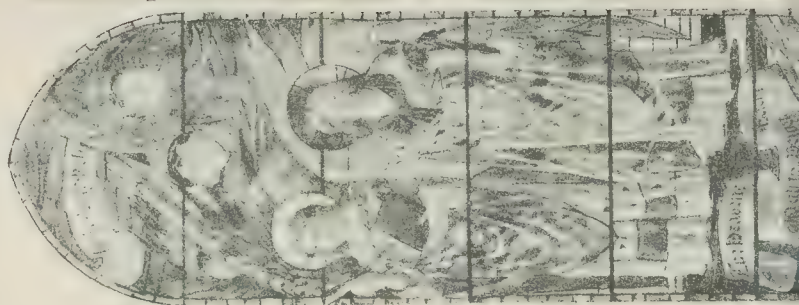
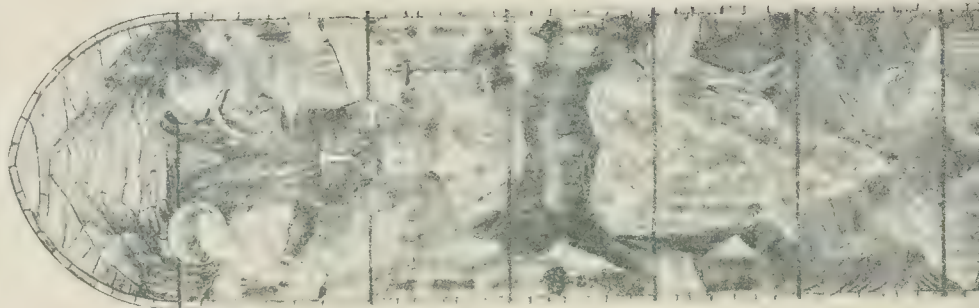


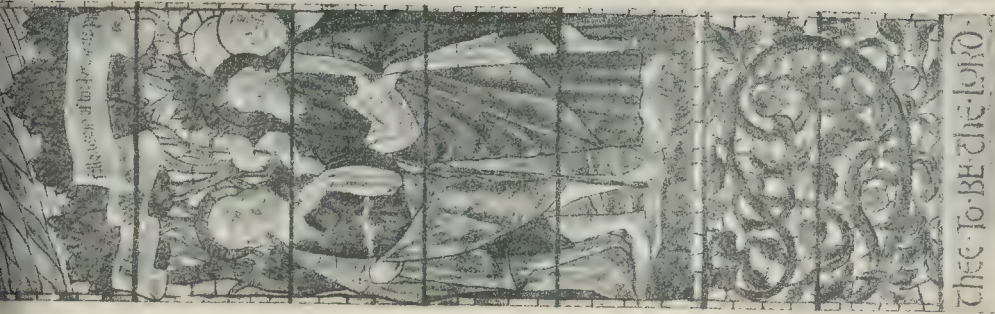
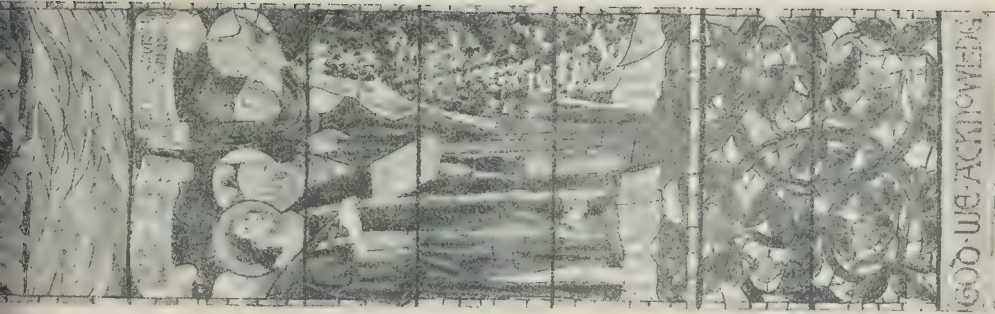
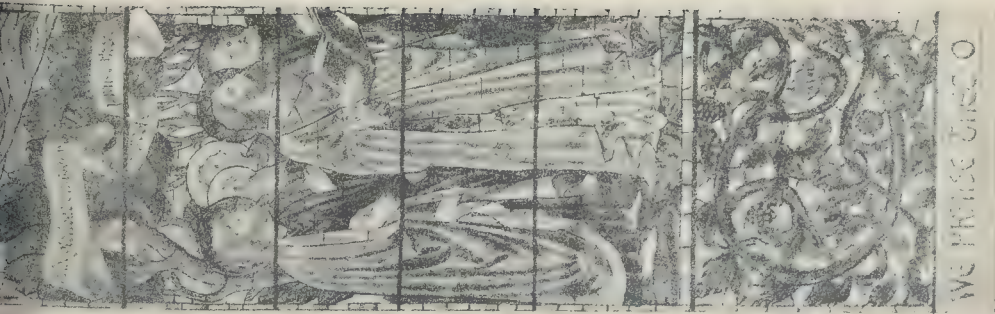
ACCOMMODATION.

NAVE	456
NORTH AISLE	125
SOUTH AISLE	189
MORNING CHAPEL	59
CHOIR.	46



PROPOSED NEW CHURCH OF ST BARTHOLOMEW, IPSWICH MA CHARLES SUMNER ARCHTCT





DESIGN FOR EAST WINDOW CHURCH OF SS SIMON AND JUDE, SOUTHPORT BY MESSRS SHIRLEY & HUNT



Tynemouth Priory and Church.

Illustrations.

TYNEMOUTH PRIORY.*

THE ruins which crown the lofty crumbling cliff at the mouth of the River Tyne are all that remain of the once famous Priory Church of St. Mary and the Saintry King and Martyr Oswin.

Nearly 1,270 years have passed since its first foundation.

It is thought by many that the Romans fortified this bold promontory, and for some time held it as a military station. The supposition is strengthened by the fact that an inscribed tablet and votive altar were found when excavating near the ruins a few years ago; they are now in the possession of the Society of Antiquaries, London.

In A.D. 625 King Edwia of Northumbria erected a wooden chapel here, in which his daughter took the veil. This simple structure gave place to one built of stone by his successor, St. Oswald, and a colony of monks was established adjacent to it. But this soon fell a prey to the devastations of the Danish pirates. In the years 888, 794, and 800 the priory was successively plundered by them.

On the invasion in 865 the monastery was burned, and also the nuns of St. Hilda, who had fled thither from Hartlepool for refuge. In 870 the monastery had been partially rebuilt, and six years afterwards it was again ruined by Halden, the Danish king, and levelled to the ground. The rebuilding of the church and its repeated destruction went on until 1008, when it was again destroyed by the Danes, and the community were driven from their monastery. The church was to some extent sheltered by the Saxon Earls of Northumbria, who had built a castle on the promontory.

"So great was the sanctity which the monastery enjoyed, that the illustrious dead were brought from various parts for interment"; St. Oswin the Martyr, its patron saint, King Edred, Henry the Hermit of Coquet Island; and after-

wards Malcolm, King of Scotland, his son Prince Edmund, and others.

A remarkable dream of Edmund the Sexton caused the complete rebuilding of the priory by Tostig, Earl of Northumberland, and the remains of St. Oswin, by Lady Judith, wife of Tostig, and the Bishop of Durham, were brought to light, and transferred to a place of honour in the church. Earl Waltheof, Tostig's successor in 1075, bestowed the church and all its possessions upon the monks of Jarow; and, again, in 1090, a later earl, Robert de Mowbray, a noble Norman (who conspired to dethrone William Rufus), out of enmity to the Bishop of Durham, gave it to the Abbey of St. Albans, who retained possession of it until the dissolution in 1539.

A colony of Benedictine monks were despatched from the parent house to restore the ruined church of St. Oswin at Tynemouth, and it is recorded that in 1110 the relics of the patron saint were translated from Jarow, where they had been sent by Waltheof, with great honour and solemnity.

Not long after Mowbray's donation the castle of Tynemouth underwent a two months' siege by the king's forces. On the place being taken by storm Mowbray fled to Bamburgh Castle, and eventually returned to the sanctuary at Tynemouth, where he was taken prisoner, remaining in captivity until the coronation of Henry I. After thirty years of imprisonment he had become aged and blind, and, tired of wars, entered his favourite monastery of St. Alban to pass the remainder of his days. Finally the earl-monk and refounder of Tynemouth Priory died in 1106, and was interred in St. Albans Abbey.

In the reign of Henry II. the liberties of the monastery were largely extended by many Royal grants.

In 1306 the priory was again ravaged by the Northumbrians. Edward II., along with his Queen, and Edward III., visited the priory and offered a cloth of gold at the shrine.

The changeable fortunes in the history of the priory, its priors and monks, the Scottish incursions, and its sufferings in the Wars of the Roses, would detain us much beyond our limit.

The condition of the priory appears to have been prosperous in the early years of Henry VIII., but in 1539 came the suppression of monasteries, and on January 12, 1539, the brethren assembled in their Chapter House to execute the deed of surrender of their possessions.

A life pension of 80*l.* was granted to the prior,

Robert Blakeney, and his eighteen brethren were allowed smaller stipends. The monastic buildings were dismantled; the church and prior's house being allowed to remain intact, the former as a parochial church, and the latter as a private residence.

The six bells were removed, it is said to London. The church plate weighed 62 *oz.* in gold, and 1,827 *oz.* in silver. The manuscripts that were in the library seem to have been gradually dispersed; a "Latin Psalter known as the Book of St. Oswin is now in the British Museum."

After the dissolution the site was demised to Sir Thomas Hilton, at a yearly rent of 163*l.* 17*s.* The church was used for parochial purposes until the year 1659, when it became too dilapidated, and service was finally discontinued in 1668.

The possessions of this richly-endowed priory were granted by Edward VI. in 1550, to John Dudley, Earl of Warwick, but on his attainder they reverted to the Crown, and in 1567 were enumerated amongst the possessions of Queen Elizabeth.

King Charles I. paid a visit to the castle on June 5th, 1633, and was the last monarch to visit Tynemouth.

Though sufficient of the two churches remain to show their former extent, the remains have suffered greatly since the dissolution from the ravages of time and military occupation. The Lady Chapel, or Percy Chantry, at the east end of the choir, was, in the early part of the present century, occupied as a military store, and had its windows blocked up, but in the year 1850 it was given back to the parish and restored by Mr. John Dobson, who also designed the present stone altar.

On passing through the ancient gateway of the castle we enter the castle yard and stand within the precincts of the abbey.

The west front, which has been greatly mutilated, is divided into three compartments by buttresses running up to its full height; the south compartment, the most complete, is divided into three stages by moulded string-courses; the first being a blind arcade of three arches, the second having two single trefoil-headed and simply-moulded windows, above which is another arcade of four compartments, the arches following the slope of the roof. The central bay contains the deeply-

* The series of the "Abbeys of Great Britain" is continued this month with illustrations of "Tynemouth." Particulars of this and of the three Cathedral series "England and Wales," "Scotland," and "Ireland" will be found on p. xx.; also (on page 1) of the recent issue, in book form, of the series of English and Welsh Cathedrals.

† Sydney Gibson.

‡ Rose's "Westmoreland," &c. &c.

* Gibson.



Tynemouth Priory.

recessed west doorway, of five orders, resting on carved capitals. The inner arch moldings have gone, but part of the jambs are left. Over the doorway are remains of the sill and jambs of a large fifteenth-century window, extending the full width of the nave, the shafts, caps, and bases of the Early window, or arcade, being visible in the southern jamb. The arcading to the northern bay has been destroyed for the insertion of a late fifteenth-century window, a portion of the jambs and arch of which are all that remain.

The nave has north and south aisles; but the greater portion of them has been destroyed; sufficient, however, remains of the foundations to show the extent and character of the original design. The first two bays from the west are of late twelfth century work; the remaining parts, as well as the piers of the central tower, part of the south transept, and a great portion of the south wall of the nave, are Norman, having been erected about 1106.* A cylindrical column and fragments of semi-circular arches are still *in situ*, at the north-east angle of the nave; foundations of other two Norman piers of the south arcade are visible. The two western bays of the aisles have been vaulted over; the clustered shafts supported by simple carved corbels still remain, with the springing stones of the chainfered groin-ribs.

A solid stone screen of Late Transitional work divides the nave or parish church of St. Mary from the presbytery or church of St. Oswin, and is built in between the western piers of the tower. It is pierced by two low and narrow doorways, giving access to the choir. Its western face is quite plain, with only the remains of a piscina near the jamb of the southern doorway. On its eastern face is an arcade of five small arches, resting on square caps; the shafts are all gone. Two of the lower piers remain to their full height; the one at the south-east angle being shown in the large view, while a portion of the base of that at the north-east corner and a few feet of the one at the south-west angle are all that remain of the other two piers.

The Norman church was originally terminated at its east end by an apse, of which a small portion of the foundations may be seen on the north side of the presbytery. On the south side of nave is a semicircular doorway of two orders. Also the lower steps of what appears to have been a turret staircase of Late work, and a small fragment of Early wall arcading near west end.

All the windows in the nave are walled up. Turning to the finely-proportioned choir of Late Transitional work, erected about 1200, we find the east end and part of its south wall only remaining. The tall lancet windows are

simple in their detail and well proportioned. There is a bold simplicity about its exterior which harmonises well with its bleak situation, being exposed to the fury of the gales from the North Sea. The plaster-like buttresses are placed at the angles and between the windows, and run up to the full height of the walls, housing the corbel tabling on the south side, and terminating in narrow buttresses in the arcading of the east gable. The angles have been surmounted with turrets. The lower part of the walls of the interior, up to the sills of the long lancet windows, have a continuous arcade running round, and on the capitals may still be seen traces of the "stiff leaf" carving. From the string-course above the wall arcade rise clustered vaulting shafts, with remains of groin ribs resting on their carved and moulded capitals. The "dog-tooth" ornament is introduced in the heads of the windows at the east end, and in the string-course and vesica above; it also appears in the clearstory windows and vaulting ribs.

In the eastern bay of the wall arcade on each side of the choir is a segmental arched recess, the one on the north side containing a slab, on which is sculptured a recumbent effigy of a female with clasped hands, but greatly defaced.

In the centre of the east wall is a deeply-recessed doorway, giving access to the Lady Chapel; on either side are ambries.

On the south side, under the middle window, are remains of an ambry and piscina, and a little further west is the double sedilia, with a "dog-tooth" ornament in the cusped arches. The bases of the north arcade of the presbytery were brought to light during excavations made under the direction of the late Mr. R. Johnson, architect, of Newcastle.

At the outside of the east end of the choir is the Lady Chapel added in the fifteenth century. This chapel is supposed to have been attached to the priory as a place of interment for the Percy family; their armorial bearings, along with those of the See of Durham, being very prominent as terminations to the hood-moulding over the doorway. The chapel measures, inside, about 18 ft. 10 in. by 11 ft. 4 in., and is divided into three bays, with a semi-octagon vaulting shaft between each window, rising from the string-course under the window-sills. There is a stone seat on each side of the chapel. Above the arched recess over the altar-table is a small "rose window" of simple design, on each side of which are niches with cusped heads, intended for statuary. On either side of the altar are ambries, and a small piscina is in the south wall.

The richly-vaulted roof is almost unique. At the intersection of the three longitudinal ribs with the transverse ribs are large circular bosses with representations of the Redeemer, Blessed

Virgin, and Apostles, encircled by a label bearing an inscription. The emblems of the Evangelists and the Battered Lamb are placed at the east and western extremities of the ribs; the small bosses bearing the sacred and other monograms, and the Rose and Sun. On either side of the "rose" window are figures representing the Annunciation, and over the entrance is carved Our Saviour seated with a figure, kneeling by his side, in supplication. The interior of the choir is in very good repair, and the windows are filled in with modern stained glass.

Externally, an excavated area having been made on each side, the base-course and the lower part of the buttresses can be easily seen; the upper part of them has been cut away.

The jambs of the windows are the same section both inside and out; but the first two, from the west on north side, differ from the others, and still remain walled up.

One bay of the south aisle of the choir still remains, with a portion of its vaulted roof, a large arch opening into it from the south transept. On the exterior face are the remains of wall arcading of the earlier Transitional work.

Some vaulted chambers on the south side of the priory still remain, but they are now used for military purposes.

Various parts of the interior of the ruins since the dissolution have been used for internments, a cliff on the south and east sides of the priory is studded with hundreds of gravestones.

The incongruity of its former associations still continues; the monks have departed, and the beautiful monastery is now a crumbling ruin, surrounded on one side by barracks, and on the other by batteries of guns ready to deal death and destruction on the enemy from the sea-girt churchyard of Tynemouth Priory. E. R. T.

CHURCH OF ST. BARTHOLOMEW, IPSWICH.

THE Church of St. Bartholomew, Ipswich, now in course of erection in that part of Ipswich known as "California," on the top of Bishop's Hill. Only a portion of the church is to be built at present, including the chancel, the sacristy, a half the nave. The remainder of the nave, the tower, and the morning chapel will be built soon as sufficient funds are forthcoming. The church is to be built of red brick, with Corbelled Down stone dressings, and the nave arcade will be of the same material. The walls will be plastered internally, and a panelled dado painted fir will run round the church as high as the sill of the aisle windows. The church will be lighted mainly by a large west window, which the width of the nave, and runs up as high as the roof timbering will allow.

The accommodation is given on the plan attached to the drawing; the congregation will be provided with chairs.

The church complete is estimated to cost about 9,000*l.*, without furniture.

CHARLES SPOONER, ARCHT.

DESIGN FOR WINDOW, SOUTHWICK.

THIS window, the drawing of which was exhibited at the Royal Academy last year, was designed by Messrs. Shrigley & Hunt, for the Church of SS. Simon and Jude, Southwark, though its execution has, owing to circumstances, been postponed. The design, as will be seen from the quotations on the scrolls introduced, illustrates the *Te Deum*.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday, at the County Hall, Spring Gardens, Sir John Hutt, Chairman, presiding.

Enacting the new Building Act.—On a report of the Building Act Committee, Mr. Probyn called attention to a recent letter in a daily newspaper in which it was alleged that the Council was endeavouring to evade the new Building Act in reference to what were known as the Drury-lane sites. He wished to ask the Chairman of the Committee whether there was any intention of evading the new law in the case in question.

Mr. Marsland, Chairman of the Committee, replied that there was no such intention.

Railway Stations in the County of London.—The Highways Committee recommended—

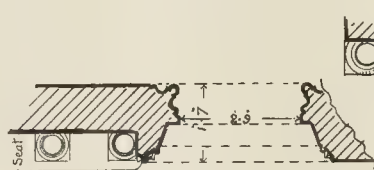
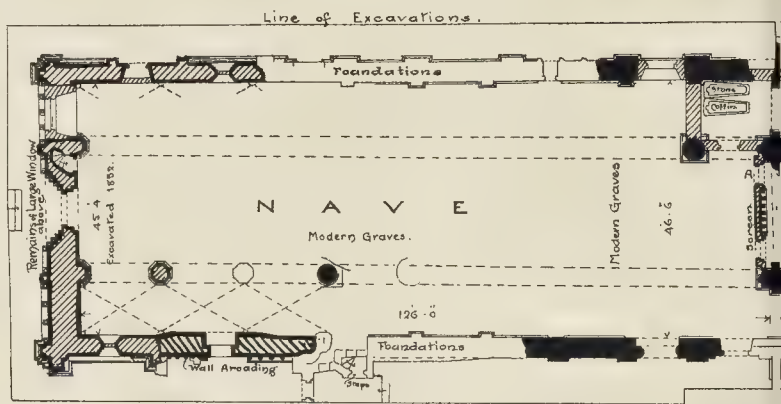
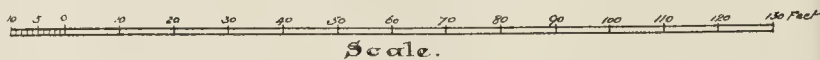
"That it be referred to the Parliamentary Committee to take the necessary measures for the introduction of a public Bill in the Session of 1895, for the following purposes:—(a) To give the Coun-

* Gibson.

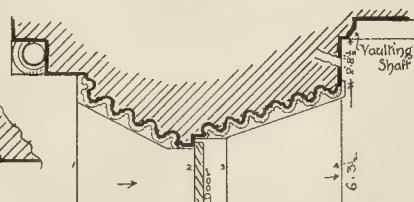
The Priory Church of St. Mary, Tyner

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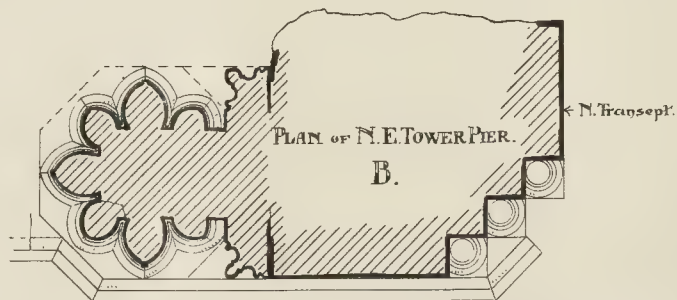
Ground Plan.



A.



C.



B.







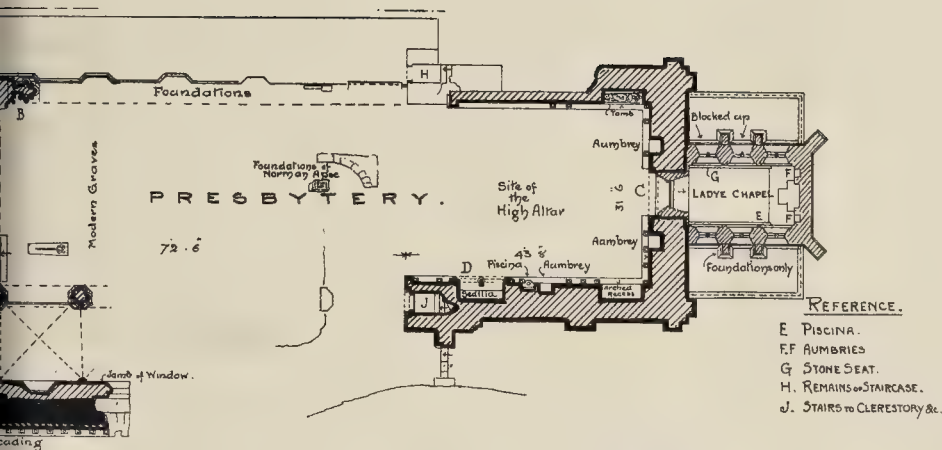
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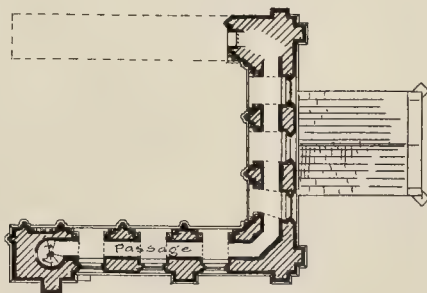
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REFERENCE.

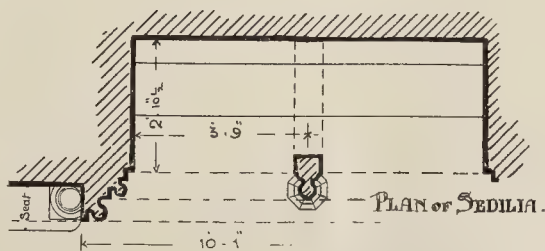
-  NORMAN.
-  FIRST "TRANSITIONAL".
-  SECOND Do.
-  PERPENDICULAR.



INDING S. SIDE OF
PRESBYTERY.



PLAN THRO' WINDOWS (FIRST STORY.)



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E. Riddale Late
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for the purpose of enabling it to make representations under the Railway and Canal Traffic Act, 1888, power to inspect from time to time the stations of every railway company in the county of London; (b) To require each railway company, before constructing a new station or reconstructing or altering an existing station in the county of London, to submit plans of the proposed works to the Council for its approval; and (c) To prohibit the erection or alteration of any station otherwise than in accordance with plans approved by the Council.

Mr. Beresford Hope moved to refer the matter back. In his opinion the Council was not a proper body to be invested with powers of interference with matters of railway management.

After some discussion the recommendation of the Committee was agreed to.

Motive Power for new Tramway.—The report of the same Committee contained the following paragraph:—

"We have considered the application made by a company called the London United Tramways, Limited, which has acquired the undertaking of the West Metropolitan Tramways Company, for the Council's consent under the latter company's order of 1887, to the use of electricity by means of overhead wires as the motive power for working so much of the tramway in Uxbridge-road, between Shepherd's Bush Green and Acton, as is within the County of London. We have in connexion with this matter received deputations from the Vestry of Hammersmith, the road authority of the district, and from the company concerned, in support of the application. The company states that the proposed system is in operation in the most fashionable streets and boulevards in Brussels, Genoa, Florence, Havre, and other important Continental cities and towns, and is about to be adopted on some of the tramways at Bristol. The system involves the placing in the centre of the thoroughfares of columns with brackets, with bare copper wires stretched between them; and, having in mind the very decided opinion expressed by the Council some time since against the proposal to adopt the road-centre lamp system for the electric lighting of the Victoria Embankment, the system proposed by the company is, we think, not likely to find favour with the Council. The company urges in support of its proposal that these columns would be of an ornamental character, and could moreover be used for the street lanterns; but we are very doubtful as to the benefit to be derived from such an arrangement. Having regard to the policy which the Council has always adopted with respect to overhead wires, it appears to us most inadvisable that it should consent to the adoption, in any part of London, of a system involving the use of overhead electric wires for working tramways; and it is to be borne in mind that, should the Council consent to the adoption of such a system for tramway purposes, there would probably arise immediately a demand on the part of electric lighting companies to be allowed to place their wires overhead also, especially as no reason can be alleged against the adoption of that course which would not apply with equal force to the tramway wires. We recommend:—

"That the consent of the Council be given to the use by the London United Tramways, Limited, of electricity by means of overhead wires as the motive power for working the West Metropolitan Tramway in that portion of the Uxbridge-road which is within the county of London; and that the Board of Trade and the London United Tramways, Limited, be informed of this decision."

Mr. Beachcroft moved an amendment to the effect that the company should be allowed to make the experiment. The condition of London, which was far behind Paris with regard to locomotion, was absolutely blocked for want of some new invention dealing with the question.

Alderman F. Williams seconded the amendment. He did not see that the experiment was likely to be attended with either danger or inconvenience. He hoped that the fanatical cry about the beautification of London would not be carried to the point of absurdity, and to the disregard of the claims of obvious utility.

The amendment, after some discussion, was defeated, and the recommendation of the Committee was agreed to.

Local Sewers.—The Main Drainage Committee reported as follows:—

"We have sanctioned, subject to conditions recommended by the engineer, the construction of local sewers as follows:—Strand: 120 ft. of 3 ft. 9 in. pipe of 12-in. brick sewer in Hart-street. Fulham: 595 ft. of 12-in. pipe and concrete sewer in Kingwood-road. Fulham Palace-road, Poplar: 840 ft. of 12-in. pipe sewer in Shoot, otherwise Beech-road, Bow. We have also renewed the sanction, given by us on December 15, 1892, and October 26, 1893, respectively, to the construction, subject to conditions, of the following local sewers:—Hamstead: 375 ft. of 2 ft. 2 in. brick sewer and 600 ft. of 15-in. pipe sewer in Constantine-road, 383 ft. of 12-in. pipe sewer in Cussy-road, and 495 ft. of 12-in. pipe sewer in Markers-road. St. Saviour's: 175 ft. of 15-in. pipe and concrete sewer in Meymott-street, Blackfriars-road."

Competitive Designs for Working-class Dwellings.—The report of the Public Health and Housing Committee contained the following paragraph, the recommendation being agreed to.

"On April 17 last we were authorised to invite competitive designs for the dwellings to be erected on a portion of section E of the Boundary-street area. We at the same time obtained authority to pay the sum of 50*l.* to each competitor, and to expend a further sum not exceeding 200*l.* for distribution among the competitors at our discretion. In accordance with these instructions we invited six firms of architects who have had large experience in the erection of working-class dwellings to send in plans, and all of them have submitted designs for the dwellings. We have carefully considered these designs, and are of opinion that the design submitted by Mr. Rowland Plumbé is the best, whilst those submitted by Messrs. Davis & Emanuel and Messrs. Joseph & Smith are entitled to high praise. As all the competitors made a reasonable compliance with the terms of the competition, we have paid to each the sum of 50*l.*, and in addition to this amount we have awarded to Messrs. Davis & Emanuel and Messrs. Joseph & Smith a further sum of 25 *gs.* each, in consideration of additional trouble to which they have been put in the matter. The competition being concluded, we considered whether the design which we had placed first could be recommended for adoption in respect of the site. We obtained a detailed report from the Council's Architect as to the merits and defects of the design, and we submitted this to Mr. Plumbé, who thereupon produced a plan which we felt justified in recommending conditionally for adoption. We have carefully considered the question of receipts and outgoings in connexion with these dwellings, and we are of opinion that if the buildings can be erected at Mr. Plumbé's estimate, the requirement of the Council that a return of 3 per cent. shall be obtained on working class dwellings may be complied with. It is, however, desirable that before the Council is definitely committed to the erection of the dwellings, quantities should be taken out, in order that we may rightly judge of the financial results of the plan, and we propose that one of the firms of quantity surveyors employed by the Council should be instructed accordingly. We estimate the cost of this to be about 250*l.* But, if it should appear upon the pricing-out of the quantities that the buildings cannot be erected for the sum which Mr. Plumbé estimates they will cost, we consider that the Council should not be committed to the adoption of the design or to payment to Mr. Plumbé in respect thereof. We recommend:—

"That, subject to an estimate to be submitted by the Finance Committee, as required by the statute, the Committee be authorised to expend a sum not exceeding 250*l.* in taking out the quantities in respect of the plans prepared by Mr. Rowland Plumbé of the dwellings proposed to be erected on a portion of Section E of the Boundary-street area."

The Supervision of Bakehouses.—The Public Health and Housing Committee recommended that the Parliamentary Committee be instructed to prepare a Bill amending the law relating to bakehouses in London, in accordance with the Council's views (expressed in resolutions passed on June 26 and July 17 last).

The Ventilation of the Underground Railways.—The same Committee recommended "That letters be addressed to the Metropolitan and District Railway Companies, informing them that the attention of the Council has been directed to the need for improved ventilation of their tunnels, and asking whether the companies propose to take any steps in the matter."

This was agreed to.

Sanitary Inspectors.—The same Committee reported as follows, the recommendations being agreed to without discussion:—

"We have had under consideration a letter from the Sanitary Inspectors' Association calling attention to the proposal of the Hackney Vestry to pay to the sanitary inspectors they are about to appoint the inadequate salary of 9*l.* per annum, and asking the Council to make a representation to the proper authorities on the subject. The Association point out that 'by sections 100 and 107 of the Public Health (London) Act, 1891, the Council has power to see that the provisions of the Act are properly carried out by local authorities, and also to secure the appointment of a sufficient number of sanitary inspectors,' and they submit that 'in the interests of the public health, the sanitary inspectors appointed should be qualified men of ability and integrity, and that to secure the services of such men it is necessary to offer suitable remuneration.' The Council must bear in mind that the confirmation of the appointments of sanitary inspectors made under the Public Health (London) Act, 1891, rests upon the Local Government Board, which has power to deal with all questions relating to their qualification, appointment, duties, salary, and tenure of office. As, however, the Council has to pay one-half the salaries of all the sanitary inspectors appointed under the Act, it seems to us that it may properly express an opinion to the

Local Government Board upon any question relating to such salaries. We are quite in sympathy with the views expressed by the Association, and having regard to the nature and responsibility of the work which devolves upon sanitary inspectors under various Acts of Parliament, we do not consider that the salary of 9*l.* per annum is an adequate one. We think the Council might with advantage communicate with the Local Government Board to that effect, at the same time expressing the hope that the Board will not sanction the appointments unless adequate salaries are paid. We therefore recommend:—

(a) That a copy of the Association's letter be sent to the Local Government Board, with an expression of the Council's opinion that the salary of 9*l.* per annum proposed to be paid to the sanitary inspectors about to be appointed by the Hackney Vestry is inadequate, and of its hope that the Board will not sanction the appointments unless adequate salaries are paid, (b) That the Association be informed of the course taken."

Architect for the Sixth Asylum.—The Asylum Committee reported that they had selected Mr. G. T. Hine, of 35, Parliament-street, S.W., as the architect for the new asylum.

Salaries for District Surveyors.—Lieutenant-Colonel Ford moved—"That it be referred to the Building Act Committee to consider and report on the expediency of arranging that all future district surveyors should be appointed at fixed salaries instead of being paid by fees." In the course of some remarks he said that, under the present arrangement, district surveyors were subject to influences which they would be free from if they were paid by fixed salary.

Mr. Emden seconded, but the motion was subsequently negatived, only seven votes being given in its favour.

After transacting other business, the Council adjourned.

COMPETITIONS.

BATHS, WALSALL.—At the last meeting of the Walsall Town Council competitive plans from the local architects for the proposed new baths were considered. The General Purposes Committee presented a report recommending the adoption of the plans marked A, providing first and second class swimming baths, Turkish baths, and twenty-five slipper baths, with engine-house, laundry, &c., at an estimated cost of 7,500*l.* The report was confirmed by the Council, and the authors of the selected design were found to be Messrs. Bailey & McConall, of Walsall.

DARLINGTON NEW SCHOOLS.—In a limited local competition for the new schools for girls and infants of Holy Trinity parish, Darlington, the plans of Mr. G. G. Hoskins, F.R.I.B.A., have been selected, and have received the approval of the Education Department.

BOARD SCHOOL, WEST HARTLEPOOL.—The competition for a board school for about 1,450 children, Brougham-terrace, West Hartlepool, has just been decided as follows:—First premiated design, by Mr. E. Percy Huide, A.R.I.B.A., 17, Queen-avenue, Dale-street, Liverpool; second, Messrs. Simon & Tweedie, 36, Hanover-street, Edinburgh; third, Messrs. Brewill & Bailly, Angel-row, Nottingham. The assessor was Mr. Mr. T. Mellard Reade, F.R.I.B.A., Liverpool.

Correspondence.

To the Editor of THE BUILDER.

INTERESTING DISCOVERY AT DURHAM CATHEDRAL.

SIR,—The enclosed cutting from a northern newspaper gives an account of the discovery by Canon Greenwell, F.S.A., of the precise termination, eastward, of Durham Cathedral, as shown by the foundations, just unearthed, of the lower portions of the walls of an apse at the end of one aisle:—

"During the present week an interesting discovery has been made at Durham Cathedral, which throws light upon what has long been a doubtful point with students of church architecture—the original form of the east end of the Cathedral as designed by Bishop Carleph, the seventh Bishop of Durham, who commenced the present structure in 1093. It has been generally admitted that Carleph's choir terminated in an apse, and the general idea was that the north and south aisles at each side of the choir continued around the apse of the choir in an ambulatory, but the discovery made this week upsets this theory, and establishes beyond a doubt the original design started by Bishop Carleph, which the present Chapel of the Nine Altars, erected by Bishop Pudsey about 200 years later, superseded. To the Rev. William Greenwell, minor canon of Durham, and a recognised

authority in church architectural matters, attaches the honour of making the discovery. Some men were engaged excavating in connexion with the proposal to introduce hot water heating apparatus into the Cathedral. They were at work at the east end of the southern aisle of the nave when Mr. Greenwell came upon them. Looking into the hole they had dug, he noticed that the outer wall against which they were working was ashlar faced, and thinking that this was strange in foundation work, he asked the men to dig a little to the east, when he discovered that the ashlar had an apsidal termination, and did not form one side of an ambulatory as was generally believed. The discovery led to a similar excavation being made in the northern aisle of the nave, and this was also found to have an apsidal termination. The wall of the apse in each case is of immense thickness and solidity. It is curved in semi-circular form on the inside and square on the outer or eastern side, and measures from its curved face to the square face no less than twelve feet. Mr. Greenwell says the solidity of this foundation work implies a superstructure of heavy masonry, but as to what Carleph intended in this direction nothing is disclosed. The excavations are going on, and it is hoped that the apsidal end of the choir will also be discovered, and if that is done the ground plan of Carleph's design as regards the east end of the Cathedral will be complete.

It had always been supposed that the apse of the choir had been surrounded by an ambulatory, a theory adopted by myself in a paper read at Durham many years ago. (Yorkshire Architectural Society, Vol. XXIII.) It appears now to be established that the Romsay treatment of three apses was also that at Durham. And it further appears more than probable that these were not merely intended, but actually built, to some extent. The choir was the earliest-built part of the Cathedral, but there is no evidence that the northern builders of the early years of the twelfth century succeeded in finishing the vaulted roof.

E. R. ROBSON.

THE NEW DISTRICT COUNCILS AND THE PUBLIC HEALTH ACT.

SIR,—In your issue of the 12th ult., Mr. Thos. G. Jackson invites the opinions of your readers on the apparent eccentricity (for such it is) of the Wimbledon Local Board in enforcing, or neglecting to enforce, the provisions of their by-laws as to new streets and buildings, and more particularly as regards the open space at the rear of domestic buildings.

Mr. Jackson has quoted in paragraph 3 of his letter a portion of the by-law regarding open rear spaces, but if the by-laws of the Wimbledon Local Board are after the Model Series of the Local Government Board he would have done well to have added the following, which is a part of the same by-law, and appears in the Model Series:—"A person who shall make any alteration in or addition to, such building shall not by such alteration or addition diminish the aggregate extent of open space, provided in pursuance of this by-law in connexion with such building, or in any other respect fail to comply with any provision of this by-law."

A similar provision to the above is found also in by-laws of an earlier date than those of the Model Series.

Perhaps your correspondent will satisfy himself on this point, as to whether such a clause exists, and if so, then the action of the Wimbledon Board in ignoring it is remarkably eccentric.

By-laws are unfortunately, however, not retrospective, and if perchance the main building was erected prior to the adoption of the building by-laws, the regulation as to the reservation of the open space will not apply. See *Tucker (App.) v. Rees (Resp.)*, 7 Jurist N.S. 659, where the court held that if a new by-law applied to open spaces belonging to old buildings it was bad.

As regards the question of what is a building within the operation of the by-laws, section 150 of the Public Health Act, 1875, provides that the re-erecting of any building pulled down to or below the ground floor, or of any frame building of which only the framework is left, down to the ground floor, or the conversion into a dwelling house of any building not originally constructed for human habitation, or the conversion into more than one dwelling-house of a building originally constructed as one dwelling-house only, shall be considered the erection of a dwelling-house.

The contention of the Clerk to the Wimbledon District Council, as laid down in his letter appearing in yours of the 12th inst., that the additions or alterations complained of do not constitute a "new building," is *inconsistent*, for if the additions were not recognised as a "new building," why were plans of the structures required submitted to the Board and approved? No approval was requisite or necessary. It would appear that the Board have stultified themselves by approving the plans, as by so doing they have tacitly admitted that the structure is a "new building."

It must, however, be admitted that the section in the Public Health Act, as to what is to be deemed a new building is highly unsatisfactory, and the

variable decisions thereon given in the law courts have made "confusion worse confounded." While the Wimbledon Board appear to have departed somewhat in this instance from, I believe, the fairly general practice of Local Authorities who look upon additions in the nature of the one in question as new buildings, it would not be an unimproved blessing if it resulted in drawing the attention of the Legislature to the defective wording of the section referred to, which is open to varied interpretations and results which are most unsatisfactory.

As Mr. Jackson points out in his letter, "If the Wimbledon Board is right, and any owner of an old building in suburban and rural districts may add to it what he pleases and how he pleases . . . blocking up the open space necessary for health and convenience, those who live among old buildings are in a pitiable case," and there is much force in this contention.

The pity of it, too, is that while municipalities are yearly spending vast sums of money in clearing out rookeries on crowded areas, other rookeries are the while rapidly coming forward, and old houses are being robbed of means of ventilation by such methods as those now brought in evidence, and owing in large measure to the confused state of the law on the subject as to what is a "new building."

The Sheffield Corporation, as pointed out by Mr. Edward M. Gibbs in your last issue, have been prescient enough to discern the harm caused by the defective section of the Public Health Act, 1875, and additions to existing buildings are in their Special Act to be deemed new buildings.

Is it not highly necessary, in the interests of public health, that a short Act amending Section 150 of the Public Health Act, 1875, should be passed, embodying the provisions of the Sheffield Act as to "additions"?

"A TOWN SURVEYOR."

SIR,—May I correct two errata in my letter of last week? The printer makes me say "as well as them," instead of "as well as they," and Mr. "Sewell" should be Mr. "Sewill."

T. G. JACKSON.

We must be allowed to say that Mr. Jackson's MS. furnished some excuse for both mistakes.—ED.

THE CAIRO MUSEUM COMPETITION.

SIR,—In the *Builder* of to-day there is an advertisement of the "jury" charged with the examination of the designs to be sent in competition for the new museum at Cairo. In it my partner, Mr. Somers Clarke, is described as "Member of the Society of Architects, England." As he is not a member of any society bearing that name or any like it, I shall be obliged if you will allow me space to correct the mistake. It probably comes of a misinterpretation of the initials F.S.A., which belong to him as a Fellow of the Society of Antiquaries of London.

J. T. MICKLETHWAITE.

January 26, 1895.

WEEKLY RAILWAY TICKETS FOR WORKMEN.

SIR,—I shall be obliged if you will allow me to place before your readers a matter of some importance to all engaged in the various branches of the building trades and executing contracts at some distance from their places of business.

It is frequently necessary to send men some few miles away by railway, and a great deal of the trouble and inconvenience caused by the daily doling out of railway fares and expenses might be avoided if the railway companies would issue weekly tickets to workmen instead of requiring them (as at present) to get tickets daily.

The system could be easily protected from abuse by the railway companies requiring workmen applying for weekly tickets to be provided with a certificate from their employers as to their *bona fide* status.

If these workmen's weekly tickets at reduced rates were issued by the railway companies much time and inconvenience would be saved and the workmen (when working at short distances away) would be able to return to their homes in the evening instead of having often to put up with the discomfort of miserable lodgings.

The principle of issuing cheap weekly tickets has already been conceded and if this matter were taken up by the various associations connected with the building trades I feel sure the railway companies in granting this concession to a trade whose railway traffic is so important an item would see that this course would ultimately be an advantage to themselves as well as a great convenience to employers and employed alike.

THOMAS FLEWITT.

A 1113, 11.

CLEANING WHITE MARBLE.

SIR,—If one of your readers can give me a hint as to the best method of thoroughly cleansing a white marble mantelpiece I shall be much obliged.

J. S.

The Student's Column.

BRICKS AND TERRA-COTTA.—V.

COMPOSITION OF BRICK-EARTHS.

FROM what has been said concerning the origin of clays and brick-earths generally, it will not be difficult to understand that they vary exceedingly in mineral and chemical composition. These attributes will be dealt with more fully in connexion with the description of the bricks made in divers parts of the country, but it is profitable at this stage, for the purpose of considering brick-earths on the broad basis, to say something of the precise nature of the raw materials. And bearing in mind the important part played by chemistry, the microscope, and mineralogy in determining the various constituents we shall find it useful to dissect clays in the light of these branches of science. We shall consider the two last first, and take them them both together.

General Observations.—Clays and brick-earths are made up, as a rule, of very fine particles of mineral matter, often so small that they cannot be seen with the naked eye. On using a lens the constituents are generally resolvable into two main parts, one being small granular fragments, and the other of such finely-divided matter as that the lens is incapable of sub-dividing it. For practical purposes, the proportion of gritty material can often be judged, by an experienced man, by merely rubbing a small sample of the earth between the thumb and forefinger. In the same way it is possible to ascertain, after a fashion, the sharpness or otherwise of the gritty constituents. As a rough and ready method, and in the absence of facilities for determining the nature of clays more precisely, this will do very well. But it cannot, of course, tell one the chemical and mineralogical attributes of brick-earths, which are the chief controlling factors in arriving at the method of preparing the raw earths, or of burning or "firing" them, and ultimately of the quality of the finished product. In other words, it is quite possible to select an earth off-hand which will make a brick of some kind, but the precise quality of the brick thus produced must be largely left to chance. The lens carries us no further than the separation of the grosser from the finer particles. We now place a sample of the brick-earth under the microscope and, using a low power—say 3-in. objective—note that nearly all the larger fragments are crystalline, but that here and there small black pieces occur. Occasionally, portions of fossil-shell, highly comminuted, put in appearance. By far the most abundant constituent, at least in most clays, is a finely impalpable mud, which the 3-in. objective is unable to satisfactorily determine. So far, our examination has not taught us much beyond the fact that the materials of which clays are made consist of sand particles, mostly crystalline, and another part which, for want of a better name for the moment we will call mud. To further examine the sample from the mineralogical point of view two courses are now open to us: the first is to have a specimen prepared and ground down to transparency as far as possible, followed by examination by the microscope in transmitted light; and the second is to isolate the coarser from the finer grained constituents and examine each separately after their having been properly prepared as micro-slides. To explain this more fully we may give a few particulars as to the method of preparing the micro-slides. It must be remembered that the object is to obtain as thin a section of the material as is possible, so thin indeed that it may be placed between two pieces of glass the edges of which will practically touch. A piece of tissue paper is ever so much too thick to use as a simile, so also is gold-beaters' skin. To make this thin preparation, however, is not a very difficult matter, and the student, after two or three failures, will have gained enough experience to enable him to obtain a fair result. The sample of clay to be operated upon must be thoroughly dried by being placed in an oven so that as much moisture as possible is driven off. It may then be pounded with a pestle and-mortar, and reduced to a fine powder, afterwards being placed in a closed vessel in the oven to get rid of any further moisture. This latter is very important with some clays. Then the powder, being allowed to cool, is mixed with Canada balsam, with just enough of the latter to cement the particles together. The object of using Canada balsam is that it has practically no optical properties, is beautifully transparent, and colourless, matters of prime importance in examining sections in transmitted light.

balsam and clay particles, when cold, will now have been converted into a hard piece of stone. From this, a thin slice may be cut, or a broad thin flake chipped off. The slice or chip may then be rubbed on water-of-Ay or any other similar grinding stone until an even surface is produced, which may then be polished. When the clay sample contains very hard gritty matter it may be necessary to rub the slice or chip on a metal plate with the finest quality and grain of emery powder. The student is strongly advised not to resort to emery powder, however, until he is well-practised in the art of preparing these slides and knows something of the optical properties of clays, so as to be able to recognise any fragments of the emery that may have become accidentally incorporated with the slice during the grinding operation. After polishing one side of the slice, the polished face should be affixed to the slip of glass to form the ultimate micro-slide. In doing this, great care must be observed not to melt the Canada balsam forming the cement of the clay particles. A little experience with the balsam will teach the student much more than can be done by writing as to how this is to be accomplished, but according as the balsam is old or new, or is in hard chips or liquid, or is manipulated by the preparator, so its general behaviour is controlled. The object is to melt as little balsam as possible on the glass slip, consistent with its being sufficient to cement the slice down, and it must not be made hotter than is absolutely necessary to do the work. At the same time the slice itself may be slightly warmed, though we have sometimes dispensed with this latter operation. Assuming the preparation has been successful up to this stage, we have now a slice of the clay cemented to a piece of glass, but the uppermost side of the slice is yet rough, and it is altogether too thick. The next thing to do is to grind this down, as before, and to keep on doing so until the merest film of the clay remains. This should then be polished, or if the preparation does not seem capable of withstanding this, a little Canada balsam may be run on to it, and to finish the process a thin cover-glass, to preserve the film, is then affixed. The final stages require the most care; it is very disappointing, after having carried the preliminary part successfully through, to make one unlucky turn at the finish and remove the whole film from the slip-glass. We have felt it necessary to go somewhat into detail concerning the preparation of micro-slides of clay, because the student will find it extremely difficult to get anyone to do the work for him, it being understood by so few of the usual mounters of micro-objects. Moreover, it saves expense and teaches a great deal to the student if he prepares his own sections, which, as we have before said, is not, after all, an insurmountable task.

So far, we have only disposed of the preparation of the slide for examination in transmitted light. We have now to consider the grosser from the finer particles in the sample of clay and to mount them. This is a comparatively easy matter with most brick-earths. The sample is securely tied up in a piece of linen or cambric and placed in a bowl of clean water, the whole being covered up to prevent dust from getting in. After a short time, when the clay has become thoroughly water-logged, the fine particles ooze out into the bowl and subside at the bottom. It may be necessary to leave the sample thus for a week or two, shifting it about now and then to facilitate its breaking up. At the end of that time the contents of the piece of cambric may be carefully washed, and it may be useful to do so in a sieve of extremely fine mesh. In an elaborate investigation sieves of different meshes can be employed to sort out the particles. Let us assume that the process has been carried out, the water in the bowl, after the last particles have subsided, is decanted off, leaving the impalpable mud as sediment. This may be placed in an oven to dry it, and then small portions may be mounted on black paper on a wooden micro-slide, or affixed to a piece of glass by means of Canada balsam. The grosser particles may be dealt with in a similar manner, and it is often useful, in addition, to prepare a thin micro-slide of them for examination in transmitted light. All is now ready for use with the microscope. We will first examine, in reflected light, the slide of prepared mud, with a $\frac{1}{4}$ -in. objective. This is now seen to be made up of myriads of particles falling into two categories, the first consisting of crystalline particles, and the second of highly decomposed mineral matter, the nature of which it is not easy at first sight to determine. Examining the other slide of fine sediment in transmitted light we notice that the fresher or crystalline constituent

is mostly orthoclase felspar,* if the brick-earth is brown the optical properties will be to some extent marked by reason of the iron to which the brown coloration is due having impregnated the felspar. All forms of iron are practically opaque in transmitted light. Minute particles of iron are also present in both the coarser and finer parts of the mud. Not the least abundant constituents are many brick-earths, even in microscopic particles, are flint and quartz. Leaving the mud for a moment, let us regard the slides of coarser fragments, both in reflected and transmitted light.

Here the microscope's function is threefold. It determines the relative abundance of the larger pieces, their shape and size, and mineral nature. The shape of the particles composing this sand will be seen to fall into five groups, which have been described by Mr. Sorby as follows:—

1. Normal, angular, fresh-formed sand, such as has been derived almost directly from the breaking up of granitic or schistose rocks.
2. Well-worn sand in rounded grains, the original angles being completely lost, and the surfaces looking like fine ground glass.
3. Sand mechanically broken into sharp angular chips, showing a glassy fracture.
4. Having the grains chemically corroded so as to produce a peculiar texture of the surface, differing from that of worn grains or crystals.
5. Sand in which the grains have a perfectly crystalline outline, in some cases undoubtedly due to the deposition of quartz upon rounded or angular nuclei of ordinary non-crystalline sand.

Of these, all kinds are fairly common in the earths used for brickmaking, except that falling into the fifth category. In brown brick-earths we not infrequently find the particles of sand coated with a film of iron. The foregoing observations do not take into account the nature of the black particles previously referred to; they turn out on investigation to be the seeds of plants, or fragments of lignitised wood. The shell fragments are mostly minute pieces derived from the trituration of larger shells, or they may be, in the case of a clay of marine origin, the whole tests of foraminifera. The advantage of a precise knowledge of the size and nature of the sandy portions of clays used in brickmaking will be very apparent to the student when considering the metallurgy of each kind of mineral found, the interdependence of one on the other in the firing process, and the influence of organic fragments on the whole.

GENERAL BUILDING NEWS.

ST. GILES PARISH CHURCH, NORTHAMPTON.—The peal of eight bells are being rehung at this church in a new iron frame, by Messrs. Taylor & Co., of Loughboro', and the clock is being restored and having Cambridge chimes fitted by Messrs. John Smith & Sons, Derby. The whole of the work is being carried out under the supervision of Mr. Holding, architect, of Northampton.

ST. PAUL'S CHURCH, MORLEY.—The new nave of St. Paul's Church, Morley, was consecrated on the 25th ult. by the Bishop of Wakefield. The edifice occupies the site of the old church, which was consecrated in 1877 by the Bishop of Ripon. The church had only sittings for 275 persons. The building committee sought the advice of Mr. G. H. Fellowes Prynne, architect, of Westminster, who submitted a report to the effect that the old building could not be enlarged in any way to meet the requirements of the district. Mr. Prynne prepared plans of a new nave, with side aisles and transepts, to afford accommodation for 800 persons. The complete scheme, however, includes the erection of a chancel, a tower with spire, and a baptistery. The cost of the whole scheme is estimated at 10,000*l.*, and the cost of that portion which has just been completed is estimated at 6,300*l.* The new church is a stone building of the Early English Transitional period. The nave, which is entered under a massive archway, is lofty and broad, 95 ft. in length and 28 ft. in width, divided into five bays, the nave itself giving accommodation for 446 adults in front of the chancel and altar. The roof is of ribbed barrel-vault frame. Stone pillars support the arches of the nave, the main piers of the arcade being surmounted by clearstory quatrefoil windows. The north and south aisles abut against the three western bays of the nave, the northern aisle being reconstructed from the north aisle of the old church. The porch leading to this is the old porch rebuilt. A double transept is thrown out on either side, terminating in a chancel aisle. The north transept consists of a portion of the old nave, rebuilt in a new position, and terminates in choir-vestry and organ-chamber. A western exit is supplied to each transept. A clergy and choir-

* For a description of this and other minerals not described in the present occasion, the student is referred to the series of Student's Column articles on "Geology," *The Builder*, 1893, July–December.

vestry, with a heating-chamber under, is placed at the eastern side of the choir-vestry, and is connected with it by a door, both entrances having separate entrances for a porch and to the church. The materials of the old church have been reused to the utmost possible extent. The seats in the nave and transepts consist of chairs. The hot-water system of heating the church has been adopted, the apparatus being supplied by Mr. de Ridder, of Liverpool. The tower has been designed to be placed at the south-west end of the south aisle, and it may be built, in future, without injury to, or interference with, the new church. The whole of the work in connexion with the erection of the nave has been carried out by Messrs. J. & J. Sugden. Mr. J. Wornell has been clerk of works, and Mr. R. H. Hale quantity surveyor.

NEW SHOW-ROOMS FOR THE GLOUCESTER RAILWAY CARRIAGE CO.—These show-rooms, which cost with the site about 7,000*l.*, have been erected on land at the corner of George-street and Northgate-street. The accommodation consists on the ground floor of one large show-room 77 ft. long by 38 ft. wide, fronting George-street and Northgate-street, another show-room opening out of this facing George-street, 58 ft. long by 19 ft. wide, a repairing shop in the rear of the smaller show-room, and a stable for the accommodation of two horses whilst carriages are undergoing light repairs. In the basement under the smaller show-room, is a cellar containing the heating apparatus, gas engine (by Messrs. Fielding & Platt), dynamo and storage batteries for supplying the electric light. The first floor of the building contains two large show-rooms, separated by rolling shutters. There is a carriage lift, capable of conveying large pantechon vans, communicating from the ground floor to the first floor. The buildings are built of local bricks, with Cattybrook facing-bricks against George-street and Northgate-street, with Bath-stone dressings, and the whole roof is covered with slate. The lift has been provided and fixed by Messrs. Waygood, of London; the heating apparatus for the whole building has been fitted up by Messrs. Haden & Son, of Trowbridge; and the rolling shutters by Messrs. Clark, Bunnett, & Co., of London. The whole of the excavation, brickwork, concrete, masonry, plumbing, granolithic and brick floors, has been done by Messrs. Gurney Bros., of Gloucester, and the carving was by Mr. Henry Frith; whilst the joinery work has been carried out by the Wagon Company's own hands, the whole having been executed to the design prepared by Mr. Walter B. Wood, architect, of Gloucester. The electric lighting arrangements have been carried out by Mr. Walton, the company's electrician.

INFANTS' SCHOOL, ST. STEPHEN'S MISSION CHURCH, BLACKBURN.—An infants' school was opened on the 19th ult., in connexion with this church, providing accommodation for 270 scholars, with separate babies' room at one end. An improved glazed folding partition divides the two classes of infants. At the main entrance there are cloak-rooms and lavatories, the inner walls being lined with white glazed bricks. The school is built with Yorkshire parquetry and dressings. The cost, including furnishing, is upwards of 1,000*l.* The whole of the work has been carried out by Mr. T. P. Wilson, of Lower Darwen, and local sub-contractors, under the superintendence of the architect, Mr. J. W. Shorrocks, of Blackburn. Mr. Billington was clerk of works.

CLUB BUILDINGS, READING.—A new Liberal Club has been erected in Broad-street, Reading, and was opened on the 25th ult. In addition to the ground floor offices for the use of the Liberal Association, there is provided for the club proper a large entrance-hall, with tiled floor and stone staircase, refreshment-room about 20 ft. by 35 ft., billiard-room for two tables, and games-room. The refreshment-room communicates with the kitchen on the second floor by a lift. On the first floor front is a reading-room occupying the whole of the frontage to Broad-street. At the rear of the reading-room is the smoking-room. Over the refreshment-room is a dining-room with lift. On the same floor there is also a billiard-room for one table. The second floor is occupied by kitchen offices, stewards' sitting-room, two private rooms for the club, bath-room for the use of members, &c. On the top floor are the bedrooms. There is a basement under the whole of the building. The whole of the premises are heated by hot water from a furnace in the basement. On the ground floor, but detached from the main buildings, and with a separate entrance from Cross-street, is the Cross-street New Hall, capable of seating about 250 persons. The Broad-street front is designed on free Classic lines, carried out in red Corshill stone, Shap granite, and local grey brick. The buildings have been erected by Messrs. Bottrill & Son, the whole of the painting having been executed and glass supplied by Mr. H. Childs. The whole work has been carried out from the designs and under the superintendence of Mr. Wm. Galt Millar, of Reading, the architect.

MISSION CHURCH, RUSHDEN.—A mission church has just been erected at the Wellingborough end of the town of Rushden. The new building is dedicated to St. Peter, and is approached from the Midland and Station-roads. It is built from designs by Mr. F. E. Preston, architect, of Northampton.

shire stone, with Weldon stone dressings. The roof is of red Brossley tiles. There is only one entrance, which is by means of a porch at the north-west. At the east end there is a chancel, with a vestry and organ-chamber on either side. There are choir-stalls in the chancel, prayer-desks, and lectern, and at the west end there is a font, designed by the architect. The chancel will be screened off on week-days, and the rest of the room used for school and other purposes. Chairs are used for seating, and the room is heated by hot-water pipes. The builder is Mr. Robert Marriott, jun.

IMPROVEMENTS AT ST. MATTHIAS'S CHURCH, TORQUAY.—During the last sixteen years many changes have been made in St. Matthias's Church, Torquay, mainly from designs of Mr. J. L. Pearson, R.A. Under this gentleman, a polished marble floor and dwarf screens have been placed in the chancel, and a sculptured reredos of alabaster reared in the eastern end. Further carved oak stalls, and a Bishop's chair, in like material, have been made and placed there by Mr. Harry Hems. The latest additions have been the raising of the fabric generally, and placing over it a roof, and lengthening the edifice westward. The contractors for this were Messrs. Bunning & Son, of London.

KIRKSTALL ABBEY.—The work of preserving the historic ruins at Kirkstall is expected to be completed before the close of the present year. The task which five years ago Mr. Micklethwaite undertook, has been fraught with many difficulties and dangers. When the abbey came into the possession of the Corporation it was in an extremely unsafe condition, and had not the contractors come to the rescue the ancient ruins must inevitably have come to the ground within a few years. The Kirkstall Abbey Committee have instructed the City Engineer to prepare an estimate for the cost of puddling the new lake in the grounds.—*Leeds Mercury.*

FREE CHURCH, EDINBURGH.—At the sitting of Edinburgh Dean of Guild Court on the 24th ult., warrant was granted to the Rev. W. Kilpatrick and others, Gorgie Free Church Trustees, to erect a new church and offices at Slateford-road. The church, which will stand in a triangular piece of ground at the junction of Slateford-road and Shandon-crescent, will, in style, be based on Scottish fifteenth-century work. The plans, prepared by Messrs. M'Arthur & Watson, Edinburgh, show a building measuring in extreme length in the interior 86 ft., and in width 51 ft. It will provide sitting accommodation for 400 persons. At the entrance is a vestibule, and at the other end a session-room, vestry, and retiring-rooms are provided. The estimated cost of the church is 4,300l.

FOREIGN AND COLONIAL.

FRANCE.—The "Union Central des Arts Décoratifs" has opened a competition for the decoration of a room, to serve as an exhibit in the 1900 Exhibition. The same body is also organising an Exhibition of decorative work by women, to be opened on April 25.—The Municipal Council of Paris has under its consideration the establishment of a funicular railway from the Gare St. Lazare, following the line of the Rue d'Amsterdam, and ending on the summit of Montmartre.—The Municipality of Creil have opened a competition for a Hôtel de Ville.—A committee has been formed to raise a monument to Fourier, the socialist philosopher; either at Paris, where he died, or at Besançon, where he was born.—The Oriental Palace on the promenade at Nice has been enlarged by the addition of a Moorish salon, lighted by electricity, and opening on the large hall. The plans have been prepared by M. Vénary, engineer.—M. Osiris, who has made such noble use of his large fortune in benevolent schemes, has given 60,000 francs to the city of Nancy (to which he had already presented a statue of Joan of Arc) for the founding of a diphtheria hospital.—The preparations for the proposed scientific, industrial, and artistic exhibition at Bordeaux are in active progress. It is to occupy the square "des Quinconces," in the centre of the town. Opposite to what will be the principal entrance to the exhibition a large monument is in progress to the memory of the Girondin deputies who fell victims to the Convention. The monument, the joint work of M. Dumilâtre as sculptor and M. Rich as architect, will consist of a large double basin surrounded by steps, in the centre of which is a pedestal supporting a column carrying a statue of Liberty. The statues of the Girondin deputies will be grouped at the base of the column.—The death is announced, at the age of 75, of M. Chas. Konot, painter, Director of the École des Beaux-Arts at Dijon. M. Ronot was a corresponding member of the Institut.—The death is also announced of a young painter of great promise, M. Charles Blite.—M. Roty, the medallist, has executed a pretty commemorative plaque in silvered bronze, to be distributed to those who exhibited in the French Section at the Chicago Exhibition. The design represents France in the guise of a female figure wearing a helmet, and stretching her arms towards a genius descending from a ship with an olive-branch in his hand. On the reverse is a cartouche, with symbolic decoration, bearing the name of the recipient.

GERMANY.—In the German Municipal Budget for

1895, which is now under consideration, the sum appropriated to scavenging works is 118,000l., including an item of 5,000l. for snow removal.—Work is shortly to be commenced on the treatment of the sewage from the Bräunenburg Gas-works.

The casing of Begas' Emperor William monument has been entrusted in portions to three foundries; the size of the concern may be judged from the fact that over 34 tons of metal will be employed.—Telephonic communication between Berlin and Memel, a distance of 1,000 kilometres, has now been established, and this is the longest the hitherto opened in Germany.—The University of Strasbourg is to be provided with a new medical school, at a cost of 40,000l.—During 1894, the Baden Limes investigations, under Professor Schumacher, were directed to the ancient frontier between Jagsthausen and Miltenberg, and to the Milming-Neckar line. On either side of Osterburken, in the forest district, the line is clearly marked by dykes and ruined towers, but between Bofenheim and Waldurn, in an agricultural country, there are no traces above ground: excavations, however, revealed the frontier mark, thus confirming Herr Jacobi's discoveries in the Taunus. Similar results were obtained on the Milming-Neckar line, where in places the wall was superseded by a military road connecting the watch-towers. Traces of Roman villas were discovered at Tielenbach and Bachenau, and a number of towers located between Neckarburken and Trienz.—At the second meeting of the German Archaeological Institute at Rome, Professor Mann lectured on the recent discovery of a Roman villa on the south slope of Mount Vesuvius, about a mile from Pompeii. The bath arrangements, including a boiler and series of pipes, are extraordinarily well preserved.

MISCELLANEOUS.

PATENT WIRE-GLASS.—A specimen has been sent to us of this glass, for roofing and flooring, made by the "Aktien-Gesellschaft für Glasindustrie," Dresden. The patent was introduced by Messrs. F. Siemens & Co., and consists in embedding a strong wire mesh in the middle of the glass in casting, thereby giving it much greater strength and elasticity. "There can," the patentees claim, "be no absolute breakage, as the interwoven wire will hold together the glass, when ordinary glass will break in pieces," and it is said to do away with the necessity for wire netting over skylights. No doubt if a weight fell on a skylight of this glass, the glass will not fall down in large pieces, as it is held up by the wire; but a wire over a skylight glass prevents the glass being broken at all, which is better. Moreover, in the case of a heavy weight, the wire would not hold this up, unless the outer strands of the wire mesh were left free of the glass, and attached securely to the frame. For upright sheets of glass it must unquestionably be much stronger than ordinary glass of the same thickness, and probably it is, as the patentees say, nearly burglar-proof, as the wire cannot be cut by a diamond. That "the interwoven wire has hardly any influence on the transparency of the glass," is a vague and unscientific statement which we should hardly have expected to find in connexion with a patent connected with the name of Siemens. In the specimen sent to us the meshes are a little under 4-in. square between the wires, and 1½-in. including the thickness of wire at each side; the precise amount of light transmitted is therefore an easy matter of calculation. It could not well be used where a good light was a necessity. It is however a useful invention for a good many purposes, and quite worth the attention of architects; only, as too often happens in circular recommendations of this kind, the patentees rather slip their case by claiming too much for it. The London agent for the glass is Mr. L. Posse (Limehouse).

MONUMENT TO THE LATE BISHOP OF ST. ALBANS.—A monument has recently been placed over the remains of the late Bishop Claughton, who is buried in the graveyard adjoining St. Albans Abbey. It is resembent in form, and is executed in granite and marble. The inscription is as follows:—"Sacred to the memory of Thomas Legh Claughton, D.D. Born 6th Nov. 1808; entered into rest July 25th, 1892. Vicar of Kidderminster 1841 to 1897; 97th Bishop of Rochester, 1897 to 1897; 1st Bishop of St. Albans, 1897 to 1892. R.I.P." I sleep, but my heart waketh.—*Gen. v. 24.* This monument is erected by the late Bishop's family, is distinct from the diocesan monument about to be set up in the north transept of St. Albans Abbey, which consists of an altar tomb, or cenotaph, on which reposes a sculptured effigy of the late Bishop, in statuary marble. The cenotaph was designed by the honorary architect, Mr. W. G. Fairchild, and is executed mainly in alabaster, enriched with marble inlays, shields with armorial bearings, &c., Mr. Forsyth, of Hampstead, being the sculptor of both monuments.

SANITARY INSPECTORS' ASSOCIATION.—In connexion with the course of lectures and demonstrations of sanitary officers arranged by the Sanitary Inspectors' Association, Mr. S. G. Fairchild, R.P.C., delivered his second lecture on "Details of Plumbers' Work," at St. James's Hall, on Saturday evening last. Mr. Thomas presided. Mr. Fairchild first explained some diagrams of plumbers' joints,

both properly and improperly made, pointing out the good qualities on the one hand and the defects on the other. He next turned his attention to the fixing of lead pipes, showing the methods which should and should not be adopted. Dealing with the question of water-closets, he described some of the earliest forms of closet and the first water-closet patented, which was invented by a watch-maker in the year 1775. The valve closet of to-day, he said, was much the same as that invented by a cabinet-maker named Brammer in 1778; the improvement was in the details, the principles being exactly the same. Mr. Fairchild enumerated the several points which were absolutely requisite in the construction or selection of a water-closet apparatus, to make it sanitary, and he then proceeded to deal with several kinds of closet. Pan closets he described as one of the worst forms in common use, adding that attempts to improve this apparatus had failed, although they were numerous in the last several years ago. He declared that the nature and operation of automatic waste-water flushing-closets were in direct opposition to the principles of sanitation. After referring to the difficulty of keeping twin closets clean, and to other disadvantages connected with them, he condemned the trapless closet. Wash-out closets were then mentioned, and he stated that these he considered an improvement on the "hopper" and several other forms. He next explained the principles of wash-down and syphonic closets, which he exhibited, and with the aid of diagrams, described "The closet of the century." Valve closets, although expensive when thoroughly well made in every detail, were, he claimed, silent in action and very durable. Trough closets were to be condemned for use in schools, workshops, &c., unless there was a sufficient stream of water constantly flowing through; for schools and workshops Mr. Fairchild recommended a form of wash-down closet. He afterwards pointed out the characteristics of a good flushing-cistern, and further observations had reference to urinals, slop-sinks, bathtubs, lavatories, sinks, cisterns, &c. Concluding, Mr. Fairchild read the ancient ordinance of the Worshipful Company of Plumbers—an exceedingly interesting document—wherein he remarked that it was a great pity that the ordinances then contained, with certain modifications consistent with the present times, could not be enforced throughout the country, especially those relating to masters and apprentices. A cordial vote of thanks was afterwards passed to Mr. Fairchild for his lectures.

STAINED GLASS WINDOWS AND PAINTED GLASS.—In the course of his second lecture at the Royal Institution on the 26th ult., on "Stained Glass Windows and Painted Glass," Mr. Lewis F. Day said that the twelfth and thirteenth century glaziers relied from the very first on the help of paint. However, when they worked in that greenish tint, which was the nearest they could get to white glass, the glazier for a while kept strictly to his glazing. With the *grisaille* began quite a new chapter in the history of stained glass, a chapter so called because the effect of the window, as the French term implied, was greyish. This was a very important phase in the art, not only from the beautiful work done in it, but because coloured glass grew, so to speak, towards the light. The first coloured windows were intense in colour, deep, rich, even heavy, and they struck a note distinctly solemn and well suited to the Medieval church. As time went on the problem of the glazier was how to lighten his glass, and he got more and more to the aid of white, which was white predominated. Then the point was how to reintroduce colour, and that of course was always the question in *grisaille*. Experts had divided Gothic art into three periods, but the less they had to do with arbitrary subdivisions of style the better. People were much too anxious to get a name for everything, and when they had a name by heart they fancied they knew all about it. The fashion of the so-called decorative period, when painting became a more important consideration than ever in stained glass, was naturalism. He did not think it marked much progress in design, still less in taste. It was a straying from the severity and good taste of one period without arriving at the freedom and attainment of the other. But in the worst times there were artists who proved themselves such in spite of their period. The lecturer also dealt with the development of larger and lighter windows, and the consequent further use of painting on glass, and referred to Birmingham, London, Liverpool, Bath, Bristol, Derby, Hull, Manchester, Salford, Huddersfield, Cardiff, Bolton, Crewe, Cambridge, Kidderminster, Preston, the Potteries, and other parts of Staffordshire. Mr. John Bowen (the President of the Association) took the chair, and after his address the report for the past six years was presented and adopted. Mr. W. Green (the Secretary and treasurer) presented the balance-sheet, which showed the Association to be in a sound financial position. The officers were re-elected, as follows:—Mr. J. Bowen, President; Mr. T. F. Ryder (London) and

Mr. J. S. Jones (Liverpool), vice-presidents; Mr. C. W. Green (Liverpool), hon. treasurer; and Mr. W. H. Smith (Northampton), hon. auditor. The meeting concluded with a vote of thanks to the Mayor for the use of the Council Chamber and to the President for his services to the Association. It was decided to hold the next meeting at Leicester in July. At the Great Western Hotel, Colmore-row, in the evening, the delegates, with the members of the Birmingham Master Builders' Association, were entertained to dinner by the President of the National Association (Mr. Bowen) and the President of the Birmingham Association (Mr. T. Barnsley). The guests numbered about 120. The loyal toasts having been honoured, Mr. C. H. Barnsley proposed "The Army, Navy, and Volunteers," and Lieutenant Colonel Stanley G. Bird and Major J. Barnsley replied. Mr. J. Bowen proposed "Our City," mentioning the public institutions as evidence of a healthy municipal enterprise. The names of the Mayor and Alderman Edwards were coupled with the toast, and his worship, in replying, claimed sympathy with the builders from the fact that his father was engaged in that industry, and he added, worked with their president at the bench. With reference to the city, he was proud of its institutions, and of the part he took in the erection of the Law Courts, the builder and architect of which were present. Alderman Edwards also said a few words in reply, and referred to the enormous progress made in the city during the last fifty years. Mr. W. Sapcote next gave the toast of "The Institute of British Architects and the Birmingham Architectural Association," remarking that in 1852, according to the Directory, Birmingham had 40 architects and 1,000 builders, while to-day the city had 111 architects and 343 builders. Mr. W. Henman, in replying, referred to the suggestion that every local governing body should have a department of works, and carry out its own building operations, as an eccentricity which became the follies of youth. In Birmingham the Corporation had wisely abandoned some of its infantile practices, and was to be commended for obtaining the services of a trained architect in important work instead of entrusting the design to the permanent staff. In this connection he asked his hearers to bear in mind the result of the exquisite design of Mr. Aston Webb for the Victoria Law Courts. Mr. Aston Webb, having added a few words in reply, the toast of "The National Association of Master Builders of Great Britain" was proposed by the President of the evening, and replied to by Mr. John Bowen. Mr. C. W. Green next gave "The Birmingham Master Builders' Association," to which the President responded, and the health of "Our Visitors" was given by Major J. Barnsley, and responded to by Mr. J. C. Holder and Councillor Parkes.

CHURCH DESTROYED BY FIRE.—On Tuesday morning Wittington Parish Church, near Chesterfield, was completely burnt down. The fire, so far as could be ascertained, broke out in the vestry through the overheating of a flue connected with the warming apparatus. The reredos was cracked and broken, and when touched crumbled to pieces. One monument alone remains. This was on the west wall, to the memory of John Dixon, Esq., of Whittington Hall. The damage is estimated at over 5,000*l.*, and is only partly covered by insurance. The most serious loss is the destruction of valuable books connected with the church and parish.

STAFF DINNERS.—The annual dinner of the members of Mr. Henry Tanner's department at the U. S. Office of Works was held on the 25th ult. at the Victoria Mansions Restaurant, Victoria-street, S.W., at 6.30 p.m. In the unavoidable absence, through indisposition, of Mr. Tanner, the chair was taken by Mr. E. G. Rivers. The heads of departments and the travellers of the firm of Messrs. Young & Marten, of Stratford, assembled at the Holborn Restaurant on the 19th ult., to meet the principals, the occasion being that of the first annual dinner. Owing to indisposition, Mr. H. H. Marten, the head of the firm, was absent. The chair was taken by the general manager, Mr. E. Montague Edwards, and the vice-chair by Mr. J. Johns. The toast of "The Firm" was proposed by Mr. Johns, and responded to by Mr. Edwards, who referred to the growth of the business and some of the large works in which the firm had been engaged. The toast of "The Dinner Committee" was submitted by Mr. Frank Marten, Mr. J. T. Emery replying. A musical programme was gone through during the evening.

ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.—In our report of Mr. Nisbet Blair's paper (pages 66-67 *ante*) the word "not" was incorrectly inserted from the end, reversing the meaning of the sentence, which should have read—"There were few who really understood the present difficulties who would agree" &c., instead of "would not agree." The insertion of "not" was a piece of gratuitous and perfectly inexcusable carelessness on the part of the printer, which unfortunately escaped our notice.

THE PHILIP MONUMENTS.—Mr. W. E. Garstin will meet at Assuan on February 2 a committee composed of Professor Sayce, Messrs. Naville, Farmer, Hall, Somers-Clarke, Hogarth, and Captain Lyons, in order to take their opinion as to the best measures to be adopted for preserving such portions of the Philip monuments as will be partially submerged by the modified scheme for the Nile

reservoir. However great the necessity may be, it is a matter of general regret that the beautiful island of Philæ should be even partially submerged.

—*"Times" Correspondent.*

EMANUEL SCHOOL, WANDSWORTH COMMON.—Last July the central light of the East window of the Chapel of this Institution was filled with stained glass, in memory of the Rev. Arthur Towsey, the late head-master. Since that time the present head-master, the Rev. A. Chilton, has collected a sufficient sum to fill the two side lights of the same window, thus completing it, to celebrate the tercentenary of the establishment of Emanuel College by Lady Dacre. The subject of the central light is the "Adoration of the Magi," above is a little choir of angels holding a scroll, inscribed "Emanuel, God with us." The light on the right has for subject, "Christ in the Carpenter's Shop," and the left-hand light contains "The Annunciation." The window has been executed by Mr. B. A. Lillie, from the designs and under the superintendence of Mr. F. Hamilton Jackson.

ELECTRIC LIGHTING OF ST. PETER'S CHURCH, EATON SQUARE.—The vicar and churchwardens of St. Peter's Church decided some time since to light the building with electricity, and at the same time to clean and re-colour the interior. The electric light has now been put in. The whole of the lights are subdivided among a number of small circuits, which are controlled by switches grouped at two points in the church and vestry respectively. The scheme of lighting is from the designs of Mr. W. Howard Tasker, Kensington, who prepared the plans and specifications, and under whose supervision the work was carried out. The contract was let to Messrs. Moody Bros., of Victoria-street, S.W.

LEGAL.

CASE UNDER THE NEW BUILDING ACT. MR. CHARLES FORSTER HAYWARD, District Surveyor for the Parish of St. George's, Bloomsbury, was summoned on the 28th ult., before Sir John Bridge, at Bow-street, by the "building owners" of Bedford-court Mansions, who set forth in their information that the defendant had served them with notice of objection to the proposed erection of a certain building, and called upon him to show why the decision should not be reversed. Mr. Horace Avory appeared for the complainants; and Mr. Freeman, on behalf of the County Council, conducted the defence.

Mr. Avory explained that the object of the summons was to obtain the ruling of the chief magistrate as to the meaning of Section 212 of the new London Building Act of 1894, which came into operation at the beginning of the present year. In 1890 his clients entered into a contract with the then Duke of Bedford to take the lease of a piece of ground in what was now Tavistock-street, but which was at that time a mews, at a ground rent of 2,000*l.* a-year. They undertook to erect buildings on the land after taking down the then existing structures, and erect certain flats in accordance with plans approved by the Duke of Bedford or his representatives, and complete them before June, 1895. The building was to be erected in five blocks, subsequently modified to four. One block had been erected, and it was now proposed to go on with the erection of the other blocks, which were to form part of the same building, the elevations being continuous. The complainants had paid since 1890 2,000*l.* a-year for the land. They had given notice to the surveyor of their desire to finish the building, and he had intimated that it now came under the new Act. The importance of this to his clients was that under the new Act the Council could require a much larger area of air space in the rear of the buildings, than they could under the earlier Acts. Therefore, if the contention of the Council were good in law, the complainants would have to curtail the size of their buildings, and there would be a corresponding reduction in the rents to be obtained. There were two questions to be decided: (1) Whether the building the complainants proposed to erect was in progress when the new Act came into force at the beginning of the year, and (2) whether, supposing it was not a building in progress at that time, it was not a building which had to be carried out under a contract entered into before this new Act. In support of his argument Mr. Avory quoted the following sections of the Act (210):—"A building, structure, or work erected or constructed before the commencement of this Act to which no objection could have been taken under any law then in force shall (subject to the provisions of this Act as to new buildings or the alterations of buildings) be deemed to be erected or constructed in compliance with the provisions of this Act." (Sec. 212) "Notwithstanding anything contained in this Act, a building, structure, or work which has been commenced before and is in progress at the commencement of this Act, or which is to be carried out under any contract entered into before the passing of this Act, may be completed, subject to and in accordance with the provisions of the Acts relating thereto as in force immediately previous to the passing of this Act."

Evidence having been given as to the agreement between the complainants and the Duke of Bedford, Mr. Freeman contended that the buildings it was

now proposed to erect were new buildings under the new Act. It was quite true that block A had been erected, but that did not throw a protection over blocks B, C, and D. He submitted that they were separate buildings, and that the agreement between the complainants and the Duke of Bedford was not a contract within the meaning of the Act. It was obvious that the duke and complainant intended from the first to treat these blocks as separate buildings. Under the agreement block A was to have a lease given to it directly it was finished, and 5*l.* on with the others.

Sir John Bridge remarked that there were two grounds on which Mr. Avory argued that he ought to give a decision in favour of his clients. The first was that the whole of these four blocks were one building which had been commenced, and was in progress at the commencement of this Act. He was inclined to think that Mr. Avory was wrong on that point, but it was not necessary to decide that. The great point to be decided was whether this was a work to be carried out under a contract passed before this Act. In his opinion it was, and the building came under the old Act. He must give to each word in the Act its ordinary meaning and its ordinary construction. It might have been better if the section he was asked to decide upon had been made clearer, but as he said before he could only give to words their ordinary construction, and his decision was in favour of Mr. Avory's contention.

Mr. Avory: I must ask for costs. We have had to come here for an interpretation of the County Council's private Act, and we prove to have been right.

Sir John Bridge said he did not think he could allow costs in a case of this kind.

Mr. Freeman intimated that the case would be taken to a higher court.

A BUILDER'S CLAIM FOR WORK.

THE case of Harris v. Murrell came before Mr. Justice Grantham in the Queen's Bench Division on the 25th ult., it being an action set down under Order XIV., brought by the plaintiff, a builder, for work done and materials supplied.

Mr. English Harrison appeared as counsel for the plaintiff, and Mr. Percy Gye for the defendant.

The plaintiff's case was that the work in question was done to the "Lion and Lamb" public-house in Deptford-yard, the defendant being the occupier of that house and also of the house adjoining. Notice having been served on the defendant under the Public Health Acts, requiring him to do certain sanitary repairs, he saw the plaintiff's son and gave him the order. The work was done and a bill was delivered which was afterwards divided into two, at the defendant's request, 70*l.* odd representing the sanitary work, and 29*l.* odd representing the structural work.

Mr. H. Harris, the plaintiff's son, proved the giving of the order by the defendant.

In cross-examination, he stated that the plaintiff was the agent of the freeholder, but the work in question had been done by Murrell.

At the end of the plaintiff's case Mr. Gye called the defendant, who stated that when notice was served on him he handed it to the plaintiff, as the lessor's agent, who said he would attend to it.

The defendant having called evidence as to the actual value of the work done.

Mr. Gye, on behalf of the defendant, urged that he was not liable for the structural repairs. The notice was handed to the plaintiff, who did the work in pursuance of his ordinary authority as the lessor's agent. The plaintiff had handed the defendant a bill for a lump sum, and then he had served his writ without letting the defendant know what items he was charging against him.

The learned judge, in giving judgment, said that he accepted the plaintiff's account rather than the defendant's, and therefore he would give judgment for the plaintiff for the full amount claimed, with costs.

CLAIM FOR QUANTITIES IN EXCESS OF TENDER.

THE case of Pink v. Warner, which was reported in last week's issue of the *Builder*, again came before Mr. Justice Grantham, in the Queen's Bench Division on the 25th ult. The action, as already stated, arose out of certain errors in the quantities used in building a house at Compton, near Godalming, the plaintiffs being the executors of Robert Pink, the builder who built the house, and the defendants the executors of Miss Lindsey, for whom the house was built. When the case was before the Court on the last occasion, the hearing was adjourned in order that counsel for the defendants might consult their clients, with a view to some arrangement being come to. When the case was called on on the 25th ult., some discussion arose between counsel. It was then agreed that the matter should be referred to a surveyor, but some difficulty arose as to what the surveyor was exactly to do.

Mr. Gully said he was quite content that the surveyor himself should adopt whichever mode was the truest method of getting out of the difficulty. There was a certified bill of extras, and the surveyor could take that with him through the building and say if those extras were to be inserted in the quantities.

The Builder.

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FEBRUARY 9, 1905

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Porches of London Houses.—Mr. J. J. Stevenson, F.R.I.B.A., Architect	Extra Large Ink-Photo.
"A Garden Pavilion": Design which Received Medal of Merit in the Tite Prize Competition.—By Mr. Banister F. Fletcher, A.R.I.B.A.	Double-Page Ink-Photo.
A Small Art School for a Country Town or Suburb.—Mr. Edward B. Lamb, Architect	Single-Page Photo-Litho.
A Town House.—Mr. C. V. Johnson, Architect	Single-Page Photo-Litho.
Infants' School, Armadale.—Mr. J. Graham Fairley, F.R.I.B.A., Architect	Single-Page Photo-Litho.
Village Church, Broxburn, West Lothian.—Mr. J. Graham Fairley, F.R.I.B.A., Architect	Single-Page Photo-Litho.

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Hints for Churches in Hot Climates.



THE great number of churches which our English architects build in such colonies as East India, the West Indies, Ceylon, &c., constitute a sufficient excuse for making a few remarks upon the treatment of Gothic churches in hot climates during the Middle Ages. Something has undoubtedly been done of late years in the way of an attempt to modify our English Gothic in such a way that although the churches erected in India, &c., should recall ideas of home, and associations dear to all Englishmen who are compelled to live away from the land of their birth, they should yet be appropriate to the climate where they are erected; but a careful study of some of the ecclesiastical buildings in Spain, Portugal, and the islands of Majorca and Cyprus, will give excellent hints, which will suggest practical modifications that may be of considerable value in the erection of such structures. It may be said, why not include Italy and Sicily? There are two reasons. In the first place, attention has so frequently been called to Italian Gothic; and in the next place Italian Gothic would not have the desired effect, because it is in every way so opposed to our English Gothic that a building erected in that style would certainly not recall "home" to the exiled Englishman. But with many of the churches in the Peninsula the case is different; they are so evidently modifications of Northern Gothic, adapted to suit the South, that they seem to show us what the Mediæval architects of England would have done if placed in a similar position to our own with regard to our colonies in hot climates.

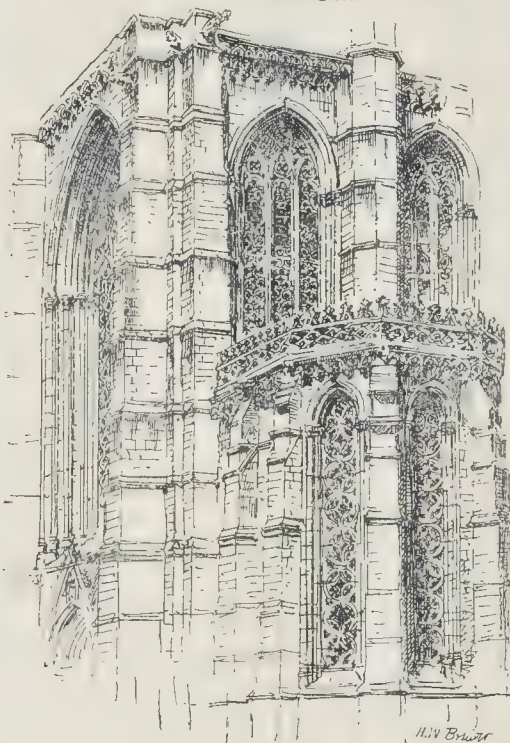
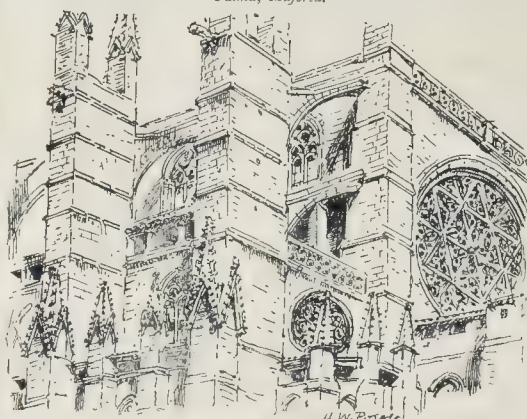
The great churches now converted into mosques at Famagosta and Nicosia are evidently the works of northern architects, adapted to suit a southern clime. Famagosta Cathedral would appear to have been designed by a German, and bears a strong resemblance to Ratisbon, while Nicosia is far more French in style. The great open-vaulted bay at the west end forming an external gallery in front of the west window of this church must have been a fine feature,

and have given the deep shadow so valuable in a burning climate. Although the indications of this arrangement are distinct, the design was either never completed, or ruined, when the building was converted into a mosque. At both Nicosia and Famagosta there would appear to be indications of the windows being blocked and the blocking masonry pierced with small apertures filled with minute tracery. The same treatment is to be noticed in the cimborio and in the clearstory windows of the nave of the beautiful cathedral of Tarragona, in Spain.

The proof that all this architecture is of northern origin is to be found in the fact that in every case there is an attempt to imitate the magnificent system of fenestration which is so marked a feature of northern Gothic. To such an extent is this carried that in the vast cathedral of Palma, in the island of Majorca, the clearstory windows are mere panelling inside and out, no portion of them being pierced. In the aisle and apse windows, the tracery alone is pierced. The same treatment is to be observed in many of the windows of the Franciscan church of St. Peter, Palma, and others in the island of Majorca; also in the cathedral Sta. Maria del Mar, and other churches in Barcelona. There is something rather unsatisfactory in this idea. Another plan carried out at Palma and elsewhere is to make the window tracery very close and complicated. The great rose window at the east end of the nave, over the chancel arch at Palma Cathedral (which is shown in our sketch) is a good example of this. The internal effect of this window is peculiarly fine; the openings of the tracery are too small and complicated for regular stained-glass, but it is filled with glass of various tints symmetrically arranged. We know of no other example of Mediæval glazing of this description, but it seems peculiarly suited to this severe and solemn building. It will possibly suggest itself to our readers that the builders of Palma Cathedral may have borrowed an idea from the Moors, and if the work had been met with in the neighbourhood of Seville or Toledo—or, in fact, anywhere on the mainland of Spain—this might have been a possible solution of its origin; but one peculiarity of the Mallorcan architects and their works was that they never, under any circumstances, took their ideas from the Moors

or Moresque art. Out of about a dozen churches in Palma which are either Mediæval in construction, or exhibit remains of Mediæval architecture, whether Romanesque, Early Gothic, or Late, we have been unable to discover the slightest trace of Moorish influence; and although the Moors were for some time masters of Majorca, scarcely any remains of their work is to be discovered. Whether they built very little, or whether the hatred which the Mallorcan had for them prompted the latter to destroy everything that could remind them of the Moorish occupation, it is impossible to say. The Mallorcan were a strong and a strange people in a very isolated position, and such people are apt to have strong feelings and display them in a very marked manner, which is even the case at the present day. For instance, the Mallorcan dislike to be called "Spaniards," and are exceedingly conservative. They would not be likely to borrow ideas from those whom they detested; and it is a remarkable thing that, although the Mallorcan architects greatly influenced Spain, they do not seem in their art to have been influenced by the Spaniards. We notice in the Cathedral of Barcelona, Sta. Maria del Mar, and other churches erected by Mallorcan architects on the mainland of Spain, that same severity which is so marked a feature of the churches and other buildings on the island. The Mallorcan work more resembles the plainer and severer work of North Germany than any other style with which we are acquainted. The perfectly plain and very lofty octagonal columns; the absence of triforium; the stern and almost Puritanical severity, remind one of the churches on the banks of the Baltic. The immense boldness of the construction and vast dimensions of the cathedral at Palma also remind one of Germany. Of course, the closeness of the tracery, and other features to which we shall call attention, arose from climatic influences, and certainly the great rose window at Palma offers a good hint for southern Gothic work. It is placed over the chancel arch. The chancel, though about 80 ft. to the vaulting, is much lower than the nave; the latter is said to be about 145 ft. high to the crown of the arch, but when it is stated that the nave is over 60 ft. in width without measuring its aisles, and with aisles and chapels together is 190 ft., some notion may be obtained of

Palma, Majorca.



Batalha, Portugal.



Batalha.

the dimensions of this gigantic edifice. The double roof over the aisles, with the space opened between them, is another admirable arrangement for a hot climate, as the current of air between the two roofs is certain to keep the interior of the building cool. At the old cathedral of Coimbra, in Portugal, all the windows and doorways have very deep reveals, externally; this, of course, necessitates immensely thick walls, and where such a luxury can be afforded, it is a perfect solution of the difficulty. The fine effect of the suite after suite of mouldings and shafts, which is obtainable under such circumstances, may be seen from our sketch of a portion of this

Romanesque church. At Belem the same effect is gained in a very much later style. At Pinha, near Cintra, heavy projecting hoods give shadow to the windows; this, however, is not quite satisfactory in effect.

The noble Abbey Church of Batalha, the "Westminster Abbey of Portugal," a building commenced in 1386, shows many excellent ideas for excluding the glare and heat, but at the same time preserving the general idea of the "fenestration" of Northern Gothic. The parapets are boldly corbelled out from the walls, so as to give the effect of balconies, and to cast long shadows upon the walls. The windows are deeply set in, and the tracery placed almost level with the inner surface of walls. There are often as many

as three distinct suites of mouldings and shafts to the jambs.

In addition to their ordinary tracery, the windows have subsidiary tracery, which spreads itself over the whole window, right down to the sill. As this is very delicately treated, the effect is rich and intricate. Of all the hints offered for the treatment of churches in hot climates this seems to us to be the most valuable and the one that is capable of the most varied and beautiful treatment. If, for instance, the outer or great plane of tracery is kept geometrical, and the inner or smaller plane curvilinear, or like "foliation," a very charming effect might be obtained. There is no reason why the subordinate tracery should not be of wood.



In most of the Spanish churches the windows are placed rather low down, so as to leave the vaulting in shadow. At Avila the triforium space is more than ordinarily deep, a treatment which can be applied to very lofty churches. Many suggestions may be culled from Northern churches; for instance: the arched *outside* the clearstory of the choir at York Minster.* The great rose window to the north transept at Amiens has also an arcade *outside*, the rose of course being glazed and the arcade left open; the reverse of the treatment of the rose windows at the ends of the eastern transepts at Canterbury. At Ratisbon Cathedral the tower windows have arcades carried right in front of them, very like York—a kind of suggestion of double tracery with the inner plane glazed. As a rule in England the tracery stops with the springing of the arch, but at Dorchester, in Oxfordshire, and the east window of S.E. chapel of Christ

Church, Oxford, it is carried down very low. At St. Barbara, Kutenberg, Bohemia, the same thing is done, but in a more skilful way, as the lower tracery does not in this case look as if it had fallen down from the head, which is the defect at Dorchester and Oxford, but is treated quite independently of the tracery in the head. The filling-in of some of the belfry windows of the Somersetshire towers is of stone arranged in tracery patterns; Huish Episcopi and Kingsbury are examples. A similar arrangement seems to have formerly existed at Magdalen Tower, Oxford. Of course, these windows are not glazed, and the treatment is somewhat similar to the subordinate tracery at Batalha.

The later Gothic architects of Spain gave up all idea of imitating the fenestration of Northern churches, and in such churches as Salamanca and Segovia, with their very small un-traceried windows, there is little to remind one of the northern origin of Spanish Gothic. It may be doubted whether this is not really the more appropriate treatment for a southern church. Indeed the effect of the interiors of these later Spanish churches is remarkably impressive and solemn, and to walk into one of them after the glaring sunlight of the streets is singularly refreshing. So delightful, in fact, is the sensation, that in Renaissance times they absolutely built churches in Majorca without windows, and in one of the old Gothic churches at Barcelona, the Renaissance men blocked up all the windows. Probably the old Roman basilica churches were very nearly dark, as the windows appear, according to Rahoul de Fleury, to have been very small and filled in with heavy iron bars. Some of the early churches in Italy and Sicily—Palermo Cathedral, for instance—have some of the windows filled with thin slabs of alabaster instead of glass. No doubt such churches were supplied with those singular Lampadaria,

consisting of a vast number of diminutive oil lamps hung on to metal frames, such as are to be seen at St. Mark's, Venice, and some Greek churches. The notion, however, of a thoroughly dark church is not pleasing to Englishmen, and one constructed after such a fashion would not at all satisfy the majority of our countrymen who, although they may be in the sunny south or the burning plains of India, like to see something that reminds them of the old churches at home with their great Gothic windows. Even the cathedral at Calcutta, with its questionable Gothic detail, enjoys a certain amount of popularity in India, on account of its supposed resemblance to York Minster(!); and several architects who have built churches in India have told us that their clients always ask them not to adopt an Oriental style, but to keep to English or, at any rate, European Gothic. The task, therefore, which the architect has to perform is to build churches which shall be European in

architecture and general form, but to modify the style in such a way as to suit a hot climate.

In all countries and at all times we find men attempting to introduce their own native architecture into other lands, but where they did so without sufficiently modifying it to suit those countries, like all exotics, the works so executed simply remained isolated examples of curious experiments. Milan Cathedral is a case in point. Though the largest Gothic church in Italy and in some respects one of the most magnificent in Europe, yet it had little or no influence upon the architecture of Italy. At Subiaco are works executed by Germans that are purely Suabian in character; and at Echternach in Luxembourg the Abbey Church has an Early English east end and clearstory, but there is no other similar work anywhere about the district. All which shows how necessary it is to modify architecture introduced from one country into another, if it is really to take root in the soil of its adoption.

NOTES.

THEN regard to the discovery at Durham Cathedral, Mr. C. C. Hodges, who has given much attention to the Cathedral and its history, writes:—"It may be well to remove a wrong impression, which, from Mr. Robson's letter in your last issue, seems to exist, that the first Norman work in Durham was not vaulted. We have not only documentary evidence, but that of the building itself, that both choir and apse had a Norman vault as early as 1104, and that the whole church was vaulted by c. 1130. Durham was therefore the earliest Norman vault in England, over the main span as well as the aisles."

THE local authorities of the Metropolis have this winter shown more perception of the duty now placed on them to clear the pavements. For some time it appeared as if these bodies were still under the impression that the duty devolved on the householders of London. The work of clearing the snow away might, however, have been done more quickly and more efficiently than has been the case in the residential parts of London. Every hour that the snow is left to be trampled on makes it more difficult of removal. Further it is noticeable that the spades provided for the purpose are usually far too light. When snow is fast fixed to the pavement a certain amount of weight is necessary to detach it. It is to be hoped also that before another winter comes round a more systematic organisation will have been created to deal with this matter. The various streets and squares should be mapped out and placed in charge of certain workmen, so that on the first fall of snow the work of removal may be simultaneously commenced in different parts. Nor can we regard the work as being properly done when the snow is left piled in heaps by the side of the pavement, on to which the passer-by must step if he crosses the street.

THE annual report of the fires in London again shows several improvements in its arrangement. The short descriptions of notable conflagrations have been supplemented by notes on all the fires classed as serious. There were 151 of these last year, and the extent and the number of appliances used are given in each case. It is a pity that no particulars are given as to the construction of the buildings attacked. Unfortunately the scope of the brigade is still limited to the extinction of fires, so that little new can be done by its officers for fire prevention except in the form of the usual summary of the "causes of outbreak." This summary, however, only treats of 2,198 of the 3,061 fires of last year, which does not speak well for the attention given to

* This is shown in the view of York Minster, published in the Builder "Cathedral Series."

this subject; no less than 863 fires are classified under "unknown causes." Last year there were 16 notable fires. Of these 8, curiously enough, occurred in couples: on February 24 and 25, April 3 and 5, September 12 and 14, and November 9 and 10. The most disastrous one, however, occurred alone in June at Tabernacle-street, E.C. In this instance no less than forty-one steamers were at work, and nearly all the available men attended, leaving large areas of the Metropolis unprotected. Though the force has been strengthened, it is still undermanned. The strain on the brigade has been most severe at times, so that the formation of properly trained and responsible part-paid reserves might be recommended. It is the best makeshift where the ratepayers do not wish to pay for the necessary number of regulars. London requires about 1,500 firemen at present, and only has 791. Sir Eyre Massey Shaw, in 1872, said 931 were necessary. The report is signed by the chief officer, Captain Simonds. Mr. Gamble, the second officer, is to be congratulated on the able way in which it has been compiled.

THE committee appointed some two months ago to consider the Light Railways question appear to have been fully convinced of the desirability of encouraging the construction of light lines, and of the necessity for some relaxation in the existing rules and regulations relating to them. The report of the committee was presented last week, and bears twenty-two signatures, six members expressing divergent opinions upon different points. The lack of progress in the construction of light lines is attributed partly to the conditions which the Board of Trade have considered it their duty to impose for the public safety, and to the want of latitude left to the Board by law. This appears a fair and reasonable way of alluding to the difficulties undoubtedly occasioned by the intervention of the Board; but a clause in the minority report asserts that "it is well known that obstacles to the construction of tramroads and tramways have been unnecessarily interposed by the local authorities and the Board of Trade," and proceeds to recommend that the Board be invested with full power to modify or dispense with any of the existing restrictions on the construction and working of tramways. This would certainly simplify matters, but was doubtless looked upon by the majority as rather too sweeping. The committee were also divided as to the desirability of permitting public bodies to subscribe or guarantee capital. The minority recommend that County Councils and other local authorities should be granted these powers; but the report refrains from giving an opinion, the committee remarking that they doubt whether this comes within the terms of the reference to them. This is an important, if not vital, consideration, but it will doubtless be fully discussed in the House of Commons when the matter is brought before Parliament.

THIRTY-EIGHT designs have been sent in for the Durham County Council Buildings Competition, the decision on which it was expected would be made known by this time. The competitors, however, have only received a circular informing them that no result has been arrived at, and that the awards cannot be made yet, owing partly to the illness of the assessor, Mr. J. Vickers Edwards, and partly to the ensuing election of the County Council and consequent change of the committee. The first reason is, of course, intelligible, but we imagine the second is the really urgent one; and it is rather bad management on the part of the Council, who knew of course when the election would come on, not to have arranged the competition so that it could be settled by the committee who had it in hand. The indefinite delay is very unfair and vexatious to the competing architects,

from more than one of whom we have received letters of complaint.

THE danger of having wires laid in conduits which necessarily entail draw-boxes or manholes has at length been recognised by electrical engineers. They can no longer blind themselves after last week's explosions at Rochester, Eastbourne, Newcastle, Dover, and on Southwark Bridge; and the recent explosions at Euston-road, Cannon-street, and in the Haymarket, are still fresh in everyone's memory. Electrical engineers are too apt to forget that long before they appeared on the scene there were often leakages from the gas-mains, and it is clearly their duty in the interests of public safety to guard against possible gas explosions in their conduits. The accident at Newcastle was in a draw-box for underground telephone wires, so what we have said applies to conduits for telephone and telegraph wires as well as to those for both high-pressure and low-pressure supply. The ventilation of the conduits would be at best a doubtful remedy, as it might draw out the gas from any leaky point in the gas-mains, and only one volume of gas to seven of air is required to make a most explosive mixture. Compressed air has been suggested as a remedy, and this would be effectual if it were not a difficult and almost impossible one to apply to a large network of conduits. Sir David Salomons has suggested filling up all the large spaces with sand or slag wool, and this plan is to be tried by the City of London Company. The difficulty of getting the sand out of the draw-boxes, when it is necessary to get at the mains, will be partly overcome by putting the sand into differently sized sacks, the larger one to fill up the bottom, and the smaller ones the remaining spaces. This seems promising, and would make such destructive explosions as the one on Southwark Bridge impossible. The safety of the public would be best provided for by the Board of Trade laying down stringent regulations regarding the making of conduits in the neighbourhood of gas-mains; just as in house lighting the insurance companies, with their strict fire rules, have done more to do away with the jerry wireman than any amount of exposure in the technical papers.

WE have received from Sir Isaac Holden, in pamphlet form, a letter addressed to him by Mr. Keith in regard to the subject of the ventilation of the Houses of Parliament, and which is evidently intended to press further the need of adopting the improvements suggested by Mr. Keith in his Report, which was the subject of an article in this journal under date April 28, 1894. The main point of the letter is directed towards the importance of adopting mechanical means for ensuring and regulating the extraction of vitiated air from the House, in place of what we called (in a sentence quoted in Mr. Keith's letter) "the clumsy and antiquated extract force of the upcast shaft and fire," which does not act equally in all weathers, and which cannot be varied in accordance with the state of the House and the numbers in it at any particular time. Some of the opinions expressed on this point in the course of examinations by the Committee charged with the subject, and quoted by Mr. Keith, are rather extraordinary; *ex. gr.*, it appears from these quotations that Mr. Taylor, the Surveyor to the Office of Works, actually replied to a question on the subject to the effect that the heated extract shafts would act more powerfully in warm weather than in cold weather; the exact contrary, of course, being the case. At the conclusion of his letter to Sir Isaac Holden, Mr. Keith sums up the existing defects in the ventilation as follows:—

- (1) That there is insufficient change of air in summer.
- (2) That the air admitted in winter is devalised by being passed over scorching steam-pipes, &c.
- (3) That although a large volume of fresh air is

being constantly blown through the centre of the Chamber from floor to ceiling, the extraction of the vitiated air in the House of Commons is so arranged that only members on the front benches get any material benefit; while those who occupy the side and end benches are invariably under a slight pressure of vitiated atmosphere.

(4) That the sewer gas of the drainage system of the Houses of Parliament being openly liberated into the lower sections of the main upcast shaft, which also ventilate the buildings, it happens, then, the sewer gas finds its way into the Committee Rooms, and into both Chambers, whenever there are any back draughts from these shafts, or, when so far as the House of Commons is concerned, one ventilating furnace may pull against the other.

(5) That the system of extraction in use, being entirely dependent on the difference of temperature between the outside air and that in the upcast shafts, it follows, that in warm weather the ventilation is not only most ineffective, but, there is a tendency to have down draughts of vitiated air impregnated with sewer-gas.

(6) That the fresh air being admitted into both Houses and to the division lobbies through gratings on the floor, it is impregnated with dust, &c.

(7) That the atmosphere of the corridors and committee rooms, &c., is subject to contamination owing to the weak and variable system of extraction from the adjoining water-closets, urinals, &c.

(8) That the atmospheric conditions are much worse in the House of Commons than in the House of Lords.

As regards the remedies, they are fully set forth in my report and in the preceding pages, and I may repeat that all the recommendations and suggestions made, can, under proper supervision, be quite easily carried out by the regular Engineering or Office of Works' staff employed at the Houses of Parliament.

THE new Turkish baths recently opened at Broad-street House by Messrs Nevill are of interest to architects as showing how confined spaces such as basements and the like can be utilised for such purposes as this in the best possible manner. The baths are situated partly beneath Broad-street House and under Alderman's Walk, from whence they are entered. The entrance forms part of a kioski in the upper portion of which are the water-tanks, masked by a Moorish treatment wall-surface, and surmounted by a cupola in the same style. These features, and the exterior generally, are executed in terra-cotta and coloured glazed faience. The planning of the baths themselves, consisting of the frigidarium, tepidarium, caldarium, radiating-room, lavatorium, &c., is cleverly arranged on a somewhat confined site, and which presented certain difficulties in this direction. The plunge-bath, shower-bath, and Russian bath, although small, are also compactly situated. The chief feature of the work, architecturally considered, is in the interior, where the walls, beams, and columns are encased with faience and tile-work, in which the joints are worked in to form part of the design, the tiles being shaped in various inter-locking designs in the Moorish manner for this purpose. We think there is some room for development in this direction, and that this is a treatment more applicable to the material than the painting of coloured surfaces, which are broken by the joints of the material. The girders are cased in the same manner by the keying of the adjoining tiles together. The wood fittings are of oak, and contrast well with the coloured tile-work. The architect is Mr. G. Harold Elphick, and the tile-work has been executed by Messrs. Craven, Dunnill, & Co., from the architect's designs.

THE London and Provincial Builders' Foremen's Association is a small society representing a class of men who up to the present have had no means of inter-communication. The society has been lately formed for meeting together and discussing matters which come within the province of an ordinary builder's foreman, and for the reading of papers bearing on these subjects. On Saturday last at the Memorial Hall, Farringdon-street, Mr. G. Barclay, the general foreman of the Works Department of the London County Council, read an interesting paper on "Roofs and Roofing," and if we may take it as a sample of the

kind of communication which the Association requires in this direction, we should say that a great deal of good must come from the discussion of such-like subjects by practical men. We wish the Association every success, believing that its members should be able to help largely the production of good and sound work in the building trades.

IN the *Builder* of November 17 of last year (page 348), we commented on the unfair and illiberal conditions issued to architects for a competition for a new school for the School Board of Weston-super-Mare. The result seems to have been much what might have been expected from such a beginning. Though no assessor was appointed in the first instance, it appears that subsequently, owing probably to some pressure put on the Board by intending competitors,* it was decided to appoint an assessor, and Mr. E. R. Robson was appointed, than whom no more competent person could be found for a school competition. At the meeting of the committee last week, it was stated that the assessor had recommended design No. 15, and the Chairman, though he admitted that he had been adverse to the appointment of an assessor (for what reason?) loyally expressed the opinion that having appointed him they ought to abide by his judgment, and one or two other members supported this view. There seems however to have been a pre-determination from the first, on the part of a majority of the committee, to select No. 3, which had been disqualified by the assessor on a technical point, as well as for serious defects in plan;† and after an acrimonious debate, in which those who opposed the Chairman supported their cause by a good deal of abuse of Mr. Robson, a majority voted for No. 3, which was "found to be" by Messrs. Price and Wooler, local architects. We have always maintained that those who are about to spend their money on a building have a right to make their own selection in the last instance, if they have good reason for being dissatisfied with the design recommended by the assessor; though, as we have also said, in the majority of cases they will probably have made a mistake in their own interests in doing so. But when we find that the argument is carried on by discrediting altogether the talents and judgment of so competent an assessor as Mr. Robson; that there is an evidently pre-ordained preference for a design by local architects; and that the senior partner of the selected firm is (so we are informed) the Surveyor to the School Board, we know pretty well what to think. About fifty architects entered into this illusive competition, in which it is tolerably certain that none of them had a chance from the first, and their time has been scandalously wasted. If the Board meant to appoint the local firm, why did they not do it at first, instead of going into this farce of a competition?

ARCHITECTURAL ASSOCIATION. DISCUSSION SECTION. SESSION 1894-5.—The sixth meeting of this Section was held at 56, Great Marlborough-st., on the 6th inst., when Mr. Harry Sitt, A.R.I.B.A., read a paper on "Domestic Metal Work." The paper was illustrated by a fine collection of sketches and metal objects lent by Messrs. Mackmurdo, Hugh Stannus, May, Hooper, Guy Dawber, and Millard. In the discussion which followed the paper Messrs. Greenop, Hopkins, Fellowes-Pryne, Rathbone, Garbutt, Guy Dawber, Hooper, and W. Henry White, the Chairman, took part.

* Since the above was written, we have been informed that the Bristol Architectural Society had issued a circular warning its members not to compete; this got into the hands of the School Board, who then made a show of amending the conditions.

† The following quotation from Mr. Robson's report has been sent to us:—"Although attractive at first sight, the scheme does not bear examination. The cloak-rooms are badly placed, and occupy positions most valuable for classrooms. They also open into the halls, a plan had on sanitary and other grounds. The numbers provide sixty more places for girls than are required by the conditions (a violation). Another grave defect is the poor position of the cloak-rooms, too far removed from the centre, and not under easy supervision. . . . The infant school would be found very inconvenient in work, two cloak-rooms being much too large, and two others of awkward size," &c.

THE ADVANCEMENT OF ARCHITECTURE.*

BY PROFESSOR AITCHISON, A.R.A.

THE question is, how the advancement of architecture is best to be compassed? Architectural advancement is dependent on many influences, two of the most important being these, that the desires of the nation at the time should run in an architectural direction, and that they should require the embodiment of the highest aspirations of the time. When such desires have prevailed there have been great architectural epochs, and there has been oftener than not at such times an emulation to surpass the grand buildings of antiquity, or those of the greatest nation of the day.

I do not think that these motives are predominant now; in fact, I should not only say that no building of importance was erected with such a view, but that such motives could, with difficulty, be made comprehensible to those in power.

If a public building be wanted it is wanted for some definite practical purpose, and mostly for a commonplace one, such as to house more clerks or to preserve a collection, and those who order it think that if it must be done it may as well be done fashionably. If society is to have a different view impressed on it, if it is to be made to feel the supreme importance of architecture to a nation, and that sublimity is the highest achievement of architecture, it will be a long and slow process, even if it be in the power of any man, or small group of men, to greatly influence public opinion.

I do not imagine that sublimity in buildings is not desired—no nation is indifferent to the opinions of the rest of the world as to its possessions, although it may be indifferent to them itself; but it would be slow in comprehending that to get a sublime building, a sublime idea is wanted to be embodied, and that the keen appreciation and admiration of his work is not only the architect's highest reward, but also the main stimulus for its production. Milton might support getting nothing for his "Paradise Lost," but would never have endured the study and labour necessary for its production, if he had not felt that his countrymen would appreciate and be proud of his achievement, and that he would take his place among the great poets of the world.

There are, however, instances within the last century and a-half of a few men influencing society generally, and this was shown by the demand for copies or paraphrases of Greek and of Gothic architecture. The Greek fashion was mainly due to the travels of a few influential and distinguished men in Greece, to the excellence of Greek architecture in its native country, to the importation of some of the finest Greek sculpture, to the publications of the Dilettante Society, and to literary advocacy, in which Professor Cockerell played a conspicuous part. Gothic came into vogue by the gradual opening of people's intelligence to the merits of the old structures they had in this country, often before their eyes; by the advocacy of Horace Walpole, of Rickman, and of Augustus Welby Pugin, and subsequently by the impassioned praise of Gothic by the Cambridge Camden Society, by Mr. Ruskin, by Sir Gilbert Scott, by Burges, and by Street, and to some extent to the ground being prepared by the writings of Sir Walter Scott, Victor Hugo, and others.

Since those days we have begun to take a very different view of architecture, and do not desire to see copies or paraphrases of dead styles built, but to see architecture brought to life again; but unfortunately this has not yet been perfectly accomplished, so the task of persuasion is much more difficult. Still it is the duty of every patriotic architect to urge the importance of architecture whenever he has the chance of doing so with effect, as it is the duty of every painter and sculptor to urge the necessity of portraying on our public buildings the beauty and character of the time, the glorious epochs of our own past, as well as those of the world's past, that have favoured freedom and progress.

Architecture raises emotions, but they are vague, and thoughts that are high, but a little remote, while the emotions produced by figure painting and sculpture are definite and more exciting, and they are urgently needed to enlighten and charm the people. The most important factor in our own hands for the advancement of architecture is the proper teaching of architectural students. In many respects

* Being the second Royal Academy Lecture on Architecture this Session. Delivered on Thursday evening last, January 31, 1895.

the teaching they have hitherto had has been good, though in some respects it could not have been worse. With such an energy, perseverance, and enthusiasm as the architectural students have lately shown, I think if they knew the right way and the right aim, and followed them, we might again see architecture recover from the suspended animation she has suffered from so long. The profession has been greatly indebted to the Royal Academy for giving some public education to architectural students when there was none to be got elsewhere. There has always been some education given by individual practitioners. As soon as the Academy was founded in 1768 lectures on architecture were given, prizes were offered, and students were allowed to draw from the antique. The prizes were a silver medal for the best measured drawings of some Classical building in London, and a gold medal for the best design for a public building, and this was, I believe, the first attempt at public instruction; but the teaching naturally carried out the beliefs of the day, handed down from the time of the Italian Renaissance—i.e., that all that was necessary for architects to learn was freehand drawing, including the figure, for, according to Michelangelo, architecture was only a branch of draughtsmanship, and all beyond was the study of Vitruvius and the Roman ruins, in books at least, if the real remains at Rome could not be reached. The Academy founded a travelling studentship so that Rome might be reached. It has since started classes for the study of planning and design. It has the finest collection of casts of Classic architectural ornament in London: too little used by those who wish to be architectural draughtsmen, ornamentalists, or scene-painters. Subsequently the Royal Institute of British Architects started a voluntary examination, which was the first attempt to turn students' attention to all the studies imperatively wanted for the exercise of their profession at that day, and it has since made the passing of an examination obligatory on those who seek for enrolment in its body: this was followed by courses of instruction on the subjects at the Architectural Association's rooms. This examination and these studies have had a most wonderful effect in improving the knowledge and skill of the rising architects. The extraordinary demand for buildings with some architectural pretensions must not, however, be overlooked. If these various means of instruction and of testing the results had embraced all the subjects I consider necessary, and given the due importance to each, I should have nothing to say on the subject.

It is most unfortunate that we know nothing of the training of Greek architects, and nothing of the training at Rome, except what we find in Vitruvius, and that Crassus started schools at Rome for teaching architecture to slaves, and is said to have made a large profit out of his venture.

We know that Constantine the Great started architectural schools in Europe and north-west Africa for free youths of liberal education, and though we are ignorant of what was taught, we guess that the methods were excellent from St. Sophia, at Byzantium, which was built some two centuries afterwards.

We know nothing of the Saracen schools, except that their architects were called mathematicians or geometers; but till Owen Jones' day in England, and M. Bourgoins' in France, the geometrical problems of the Saracens had been unsolved. We know nothing of the Romanesque and Gothic schools of Europe, except that they existed in the Abbeys from a very early date, and that shortly after the thirteenth century, the French architects withdrew from the wing of the clergy, and formed lay guilds of their own. To this we may add the testimonies of Professor Willis and Viollet-le-Duc as to the great skill of the Gothic architects in descriptive geometry.

The Renaissance school, of early days at any rate, was the measuring of Roman ruins, and subsequently of studying the portrayal of these ruins in books, still carried on to this day, with the addition of Gothic. Whatever may have been the merits of the Roman buildings, and they were great, Roman architects had this capital fault, that their object was not to invest their own new arched construction with appropriate forms, and so create a style, but to overlay it with the post and lintel work they had abandoned in their construction.

There are certain things architects must know they must know how to construct, to plan, and to bring the whole building into some rhythmical arrangement. I want you to see all that artists,

as artists, can do; the musician can only express himself by music, the poet by words in rhythm, the painter by pictures, the sculptor by carved or modelled form, and the architect by building. As architects, all your learning, knowledge, and wisdom, all your skill, all your thoughts, emotions, desires and aspirations, all your taste, morals and manners can only be shown by building. It is true that at certain epochs painters were not quite sure that their portrayals would be recognised, and wrote on a scroll, "This is a lion," or what-not, and certain architects also being doubtful about the sacred character of their edifices, have had "Little Bethel" inscribed on them; but these are but mean expedients, which masters of the different arts would not resort to now. The knowledge of building is gained in two ways, by experiment and calculation, and by experience. Experience is the earliest and in most cases the simplest way, and was the method followed by the ancients and the Medievals. Our Building Act takes the long walls at Hadrian's Villa as its datum; these long isolated walls have stood 1,757 years at least, and are sixteen times their thickness in height, so this ratio of thickness to height was taken in the Building Act for ordinary walls, though it is doubtful if any ordinary walls are equally well built now, for Professor Middleton tells us that in making the modern alterations at Rome, it was necessary to blast the rubble work. If, however, we want many walls for purposes that this wall did not meet, it is easier to learn what their proper thicknesses should be from experiment and calculation than to look up examples that fit the conditions, which could only be found after a long search, and should we even find an example, it would only show that such a thickness is not too thin, but it may be a great deal too thick. Supposing we had many walls to build that had no other force than the wind to resist, we might thin each successive wall until it blew down, and then we should know that it was too slight; but this, though it was the ancient way, is a costly way of learning, even if it involves no other consideration; for the wall in failing may destroy property, or even maim or kill people.

Statics are therefore to be learnt, and we can see what results have followed on this knowledge and that of the strength of iron and steel, by the marvellous iron structures of the engineers.

All walls above ground have to bear the pressure of wind, and some have to bear the pressure of earth or of water as well, while others have to bear loads besides their own weight and the weight of floors and a roof, as well as thrusts from arches, vaults, or domes, and the weight and thrusts of gables stowed against them.

We do not often want to know the strength of bricks in tension and in cross strain, except as corbels, but we want to know it in brickwork for fence-walls and chimney-stacks, and even for walls while being built. For stone and marble, this knowledge is indispensable, and yet there are few, if any, published experiments.

It is remarkable how impervious quarry-owners and stone-merchants are to argument on this subject, but their minds would be opened if architects refused to use their goods unless furnished with exact data of their qualities. They have for at least a century past been aware of the supposed importance of knowing the crushing weight of stone, which is almost useless, for we want to know the cracking weight, as that shows when the material has been strained beyond its power of resistance. Hodgkinson started experiments on the tensile strength of stone, but was persuaded to give it up by a mason, who believed in the rule of thumb; though pendants are wholly in tension, and lintels, steps, and landings are in cross strain. Twenty years ago I wanted to use some very large granite corbels, but could not find any data as to the strength of granite in tension or cross strain, and so had to use iron, and though I pointed out this want to the largest and most intelligent of the granite merchants, he preferred saving his money to enlarging his business. Stone and marble are largely used for lintels, landings, steps, corbels, and cantilevers, but the rule of thumb dies hard. I believe I was the first architect who persuaded a large marble merchant to have Sicilian marble tested for tension and cross strain. The architects of the last period of Gothic used stone pendants and pierced cantilevers plentifully; the knowledge gained by their experience was, I suppose, a trade secret, for the results of them have never been published. We also want the knowledge of cross strains for the different sorts of woods, but, except for hard foreign woods of modern introduction, there are ample data.

Hodgkinson's fame rested on his elaborate and complete investigations of the strength of cast-iron in compression, tension, and cross strain, as well as on researches for the best form of cast-iron columns, stanchions, and girders. Fairbairn was, I believe, the first who tabulated these qualities in wrought iron, from the experiments made by the Chester and Holyhead Railway Company. Without these data, all the wondrous ironwork of the modern engineers could never have been carried out. Without the knowledge of the powers of stone that the Gothic architects had acquired by practice alone, their marvellous works could never have been executed, and even now the want of this knowledge prevents much originality in construction and in form that we might otherwise see.

Architects avoid the use of ornamental ironwork when it is structural, because it involves a knowledge of the material, of calculation, and statics, and yet we must look forward to its greatly superseding more time honoured materials. There are, of course, a few examples of ornamental cast-iron columns, stanchions, cantilevers, bressummers, and girders in England, and it has been used for ornamental columns and stanchions at railway stations, at the National Library, and for the girders of the entrance hall of the Fine Art School at Paris.

Besides the necessity of knowing statics and the strength of materials for safety, this knowledge does two things for us on the artistic side: it gives us some of the main proportions, some of the necessary shapes, and roughly the forms into which the strains on structural parts will allow the materials to be cut away.

Most of the architecture of that part of the world that eventually came under the Roman sway, was distinguished quite as much by its advance in construction as by æsthetic difference; with the exception of Greek, and perhaps of Saracen architecture; supposing Stonehenge to be antecedent to Greek architecture, the constructive principle was the same—it was post and lintel work, the one rude and savage, the other finished with the greatest æsthetic refinement that the world has yet seen, or is likely to see.

Roman architecture was marked by the introduction of the arch and by a continual progression towards the abolition of the lintel, until the final and complete triumph of the arch, the vault, and the dome in Byzantine days.

The Saracenic, when it got to have a very marked style of its own, was rather characterised by æsthetic change than by structural advance, by the foiling of arches, by stalactite corbels, capitals, cornices, and ceilings, and by recondite geometric patterns.

Gothic owes its distinctive character quite as much to its structural advance as to its æsthetic peculiarities. The adoption of the pointed arch gave a freedom to vaulting that it had never before enjoyed; for by means of the pointed arch any space, however irregular, could be vaulted; the discovery of the means of balancing opposing thrusts, the improvement of the buttress by set-off and pinnacles, and the perfecting of the flying buttress, gave constructors a power never before known and never rivalled since, till the investigation of iron had placed a greater power in the hands of the engineers.

It seems doubtful if more can be known about the capabilities of stone than was found out by the Gothic architects; it seems hardly likely that supporting members can be made slimmer or screening parts slighter if any durability is wanted; and this by no means exhausts the list of the various wonderful ways in which it was used in cross strain and in tension, for you may see a pendant in the middle of a set of vaults where you would expect to see a column. Stone was pierced into lace work, it was cut into fringes, it was used as pierced cantilevers to support slabs or vaults, and it was twisted into every possible shape that stone should not be used for, particularly in flamboyant windows and window-heads, and this was not the mere piercing through of a slab, but consisted of pieces mechanically put together.

Æsthetically, however, stone might be used in shapes as slight as in Gothic, but of wholly different forms. If the taste of succeeding generations should turn towards slightness, or the parsimony of this require it, I think it is to the metals we must look for the material. The difficulty in using iron æsthetically is that from its very strength it tends to effacement, setting aside all the difficulties arising from its expansion and contraction, its condensation of damp vapour into water, its rusting, and the difficulty of making water-tight joints with it and glass, particularly when these joints are on horizontal planes.

Another drawback to the æsthetic use of structural ironwork is the prosaic reason that no one will pay the architect for designing it, as it involves four or five times as much time as similar work in the older materials. No one will pay for this extra time and skill, the architects being probably expected to live on the iron-filings, as Mark Pattison said the etymologists were expected to live on Greek roots.

It is easy to say learn geometry, mathematics, statics, and the strength of materials, but it is what few men can thoroughly acquire in that part of their life which is devoted to learning, and these sciences are wanted to be known before construction can be properly entered on. A very ready means of learning solid geometry is by practical stone-cutting, where this is carried only to a small scale with blocks of plaster, and it gives lessons in accuracy as well as in the use of tools, not to speak of its making the fingers nimble and curing clumsiness. At the Renaissance nearly all artists were apprenticed to goldsmiths; it is supposed mainly for this reason, though partly, no doubt, as giving them a handicraft to live by, if they failed as artists. Francia put to all his pictures "Francia, goldsmith."

The study of geometry, besides its other practical and mental uses, was used by the Saracens in a new æsthetic way; they doubtless picked up the original idea from the Byzantines, but they not only carried it much farther, but farther than it has ever been carried before on science, though I think that a deep study of geometry must have been one cause of the peculiar artistic development of Gothic. The Saracens found out that a few simple forms of solid geometry, when ingeniously put together, produced as marvellous effects as a few bits of coloured glass produce in a kaleidoscope, and whether from imitation or from independent discovery the Gothic architects have occasionally used the same methods.

It is the possession of so many inconsistent arts and sciences by the same man that makes great architects rarer than the black swan. It cannot be said that the possession of a sentiment for form and a sentiment for colour are inconsistent with one another, or else we could hardly have painters; but in their highest development these two gifts are rarely found in the same man, even if they be joined in the same nation. The Tuscans and Umbrians were formists, the Venetians, Parmese, and Modenese, colourists.

It is not a very rare case to see a good painter who is a good sculptor too, though the reverse is much rarer; but to find a geometer and mathematician with great ingenuity as well, who has taste and artistic invention, is very rare indeed. The former conjunction seem to belong to the same group of qualities, the latter to belong to opposite groups.

It would, however, be trebly foolish of the architects to abandon construction; it is his structural ability that now gives the architect a certain degree of weight and of respect among mankind, it is the very foundation of their business; and if they relinquish it they not only sink in the estimation of mankind, but ought to sink in their own estimation, for they desire to be designers, instead of architects. That their designs are to be built gives them reasonableness and stability; they are not dreams, nor visions, but things which can be built, and when built will stand; and, lastly, the intimate acquaintance with the material and the office it has to fulfil will greatly determine the shape of the parts of a building, and will enable them to know where, and to some extent, how it should be enriched by the sculptor or the painter.

Construction is not only intrinsically the most important factor in architecture, but at the present time it is imperatively necessary to be insisted on, because of the tendency to look down on it and to shirk it, and because it is partly through necessary variations in shape, on account of the qualities of the new materials, that we must look for an improvement, not only in the method of learning architecture, but in architecture itself.

I am not sure, in a certain sense, that I ought not to have put planning before construction, for what is to be built must be arranged in some fashion before it is begun; but as the art of building is the most important factor, I put it first.

Planning requires an elementary knowledge of geometry, and much ingenuity, even for the commonplace plans that every architect has to make; but besides this knowledge and this quality, planning is a transcendental art as well, for in complex or grand structures it admits of a

larger grasp of mind being shown by some architects than by others, both in disposition and in shape, and the test of this superior capacity in arrangement is, that the plans look simple, natural, and inevitable, and this may even apply to peculiar shapes, like those at St. Sophia.

The plan of every building should suggest to an architect not only how the building is to be constructed, but how the whole of its outside is to be arranged. There can be no question about the plan showing the construction of a building when it is to be vaulted or domed in masonry, or where masonry towers or lanterns are to be used, as the doming or vaulting has to be first arranged, and then the piers or columns that are to support it, and the main divisions of the ground plan are not kept to in the roofs, fatal blemishes ensue. The want of this necessary consideration, and the ease with which strong girders can be used, often spoil buildings which would otherwise be excellent. The outside suggests that the plan of each story has been made separately and independently; porches and bays jut out across the lines which should mark the divisions of the structure, or across the bearing ends of the gables. French architects who visit London shrug their shoulders at such examples. I hope to devote a lecture to the subject of planning.

It is convenient in analysing architecture to separate it into its main divisions, to call the strictly necessary part of construction that does not even seek to raise emotions, building; to call the arrangement, whether it seeks to raise emotions or not, planning, and the fine art of building æsthetics, though often vaguely called architecture. It may also cause confusion if we now consider in what the æsthetic part mainly consists. It principally consists in ratios or proportions that are agreeable to the eye, just as music mainly consists in ratios of sounds that are agreeable to the ear, but in both cases with exceptions, and in both cases the foundation of these ratios is mathematical. In architecture these agreeable proportions may either be due to accident or to art—for example, we sometimes see the dead wall of a cottage with one single opening in it that is fine architecture, but it was made accidentally by the bricklayer; the owner wanted an opening in the dead wall, and the size of the opening was probably the effect of chance, the height and length of the wall were settled by the requisite lengths and heights of the rooms, the harmony was accidental, but the most supreme art could not have produced anything finer; this, of course, is a rare instance, as there are many millions of chances to one that these ratios would have been vulgar or ugly rather than beautiful. We may, therefore, discard accident as a means of success, but when we meet with such a case, we should secure the measurements for study and consideration, if not for future use. In the case mentioned, sketching would have been of no more use to an architect than to a musical composer, but sketching is generally of more use to architects, as it not only renders them "scientific observers of physical beauty," but it is the means of noting the original or striking motives they may see; while the musical composer notes the airs, tunes, and striking noises he may hear in a different way. There are, however, in the productions of architecture many other laws besides the different applications of proportion, and to this subject I hope to devote a lecture.

The next division I make is purely artificial, and consists of the analysis of the ways of producing different sorts of emotions, from delight to horror, as it really belongs to the last division; or these emotions must necessarily be produced by different ratios and by different applications of the laws, and to this subject I mean to revert.

The last division will be an attempt to show how the spirit of the age may be impressed on its architecture, if this does not evolve itself out of the former investigations; for we may perhaps come to an extraordinary conclusion as Plato did about justice, for after hunting for it through the whole Republic, all he can find out is that it must be minding your own business.

The architect must have, too, such knowledge of sculpture and painting as will enable him to prescribe the scale and to point out the size of the masses and the tendency of the lines required, so that the two arts may enhance one another. The sculptor and painter ought to know this too, but one or both of them may not, or may think the architecture too unimportant to be considered, and treat it just as architects have sometimes treated painting and sculpture.

If sculptors, painters, and architects are to work together so that their works may form one perfect whole, it is necessary that each of them

should have some elementary knowledge of the other two arts, at least enough to prevent each man's work from spoiling that of the other two, and that is why it is so valuable for the painters and sculptors to attend the architectural lectures, and for the architects to attend those on painting and sculpture. I do not suppose that any architect, sculptor, or painter would wilfully spoil the work of the other two, but they often do.

Architects in designing pedestals for statues, occasionally put a cornice of such projection and with such strongly-marked detail, as to attract the eye from the statue to the pedestal. In memorial tablets with a bas-relief, the architectural details are sometimes so pronounced that the bas-relief looks like a roughened slab, while it is in this part which the architecture ought to support and emphasise, as the accompaniment should the song.

If, too, the architecture is barbaric, it makes all refined sculpture and painting out of place. Though I do not care about having a solid wall turned into a panorama or a battle-scene, although that may be but a personal peculiarity; but to have a building, a hall, or a room that is of dignified proportions dwarfed by gigantic figures cannot, in my opinion, be defended.

Michelangelo has given the most signal example of this blunder, by the gigantic decoration of the ceiling at the Sistine Chapel; he has made that vast hall look like a doll's-house. It may be said it was worth destroying the Sistine Chapel to get the finest work of modern times, still Phidias did not spoil the Parthenon. When it is considered that besides the arts and sciences enumerated and those that are understood, that the architect has to be a judge of the bearing power of the ground on which his building is to stand, that he must have some judgment as to the qualities of all the materials used in a building; that he is the general of an army of excavators, bricklayers, masons, and carpenters of slaters, tilers, plumbers, zinc-workers, and coppersmiths, of plasterers, joiners, painters and glaziers; of grate and stove makers, hot-water men, gas-fitters and electricians, bell-hangers, locksmiths and ironmongers, you may wonder how it is possible for any human being to acquire so much knowledge, and ask yourselves if twenty years' study will enable him to do so.

Sir John Soane is said to have rebuked a young architect who asked for his help to get an appointment, by saying "Do you think you are fit for the place!" The young architect retorted rather warmly, "I have been articled for seven years, so I ought to be fit." "Why, sir," said Sir John, "that is the time it takes to make a chessmonger." I beg you all to devote yourselves to your profession exclusively, until you have mastered the necessary elements: when you have done that, every accomplishment is of indirect advantage, from jumping a five-barred gate to playing the fiddle, or to reading a Greek play in the original. Be sure, however, that you are a competent architect first; if you are not that, though you may have a smattering of every art and science in the world, you will only earn Martial's compliment to Attalus, "You are a great meddler." The advice, too, on the temple of Delphi is useful for all, "Know thyself." It is excellent to rival the great architects of the past if you can, and few of us know what we can accomplish by close application, unwearied perseverance, and wooing the art in season and out; still it is not thought wise to begin a great mansion, if your means will only allow you to finish the stables.

I recollect a man asking my father to recommend him for the Gresham Lectureship on Astronomy, and added "I am going to be an architect." My father said, "It is rather late to begin." "Oh," said he, "Sir C. Wren held this astronomical lecture before he began to study architecture," but I never heard of this gentleman getting beyond astronomy.

Let me again recommend to each of you to know yourself, and also to bear in mind the proverb, "All men cannot do everything," and having determined for yourself that you can master architecture, keep at first to those studies only which will enable you to build soundly, without which you cannot be an architect, to plan conveniently, and to bring your building into the pale of æsthetics, so that it may be decently proportioned, and have some rhythm in it. You will not only make a decent habitation for man to live in, but will bestow on it some of that character and dignity that it behoves every civilised man to require in his dwelling, so that it cannot be mistaken for the den of a wild beast, the shelter for a tame animal, or the hut of a savage. Happily each branch of architecture is transcendental. You never need fear that you

have mastered every branch of the art, or weep like Alexander, because there are no more worlds to conquer; but when you have mastered the necessary part, there is no reason why you should not try something outside it, which may be called an accomplishment. You must have exercise and recreation for your health, but it is much better for an architect to be a poor ornamentalist, painter, or sculptor as well, than to have spent twice the time that such a smattering would have taken in learning to knock a ball into a hole with a stick in a close room.

Only, recollect this, that with a most exacting profession before you, unless you have abilities of a very rare order, you can hardly expect to be good at your profession and excel in other arts that men have devoted their whole lifetime to master. It is one of the signs of the fascination architecture once had that Brunellesco should have left his sculpture, Bramante and Baldassare Peruzzi their painting to become architects.

I hope that among the students to night there may be a genius who can rival Bacon in the width of his knowledge and the depth of his penetration. Such a man may try to rival the great geniuses of the world, Orcagna, Leon Battista Alberti, Michelangelo, or Leonardo da Vinci, in Italy, who were mathematicians, musicians, poets, painters, sculptors, and architects; Perrault, in France, and Wren, in England, are other examples of excellence in various arts. Wren was a scholar, an astronomer, a mathematician, a mechanical inventor, a demonstrator of anatomy, a physiologist, and the pioneer of hypodermic injections, a great constructor, and one of the most prolific architects that ever lived. Some of his works are beautiful, such as the spire of St. Magnus the Martyr and Bow steeple; St. Paul's is perhaps the finest example of the late Renaissance cathedrals, infinitely surpassing St. Peter's in outline and composition. All Wren's plans show a mastery of the art of planning, and some are both original and charming, and all his works have a flavour of the grand style about them. Wren, too, would have been a commanding figure in any of the many arts he learnt or dallied with, but it is the merit of the architecture of his day, that it had the power of attracting to it and absorbing so great and widely gifted a man. As soon as modern architecture can be brought to life again, we may look to its attracting some of the greatest men, for, as Aristotle affirmed, it is one of the master arts of the world.

THE ARCHITECTURAL ASSOCIATION: ARCHITECTURAL PERSPECTIVE.

THE ordinary meeting of the Architectural Association was held on the 1st inst., in the Meeting-room of the Royal Institute of British Architects, Mr. E. W. Mountford (President) in the chair.

Mr. T. W. Aldwinckle was elected a member, and several donations to the Library were announced.

The President stated that Mr. Lewis wished a few more members for the water-colour class.

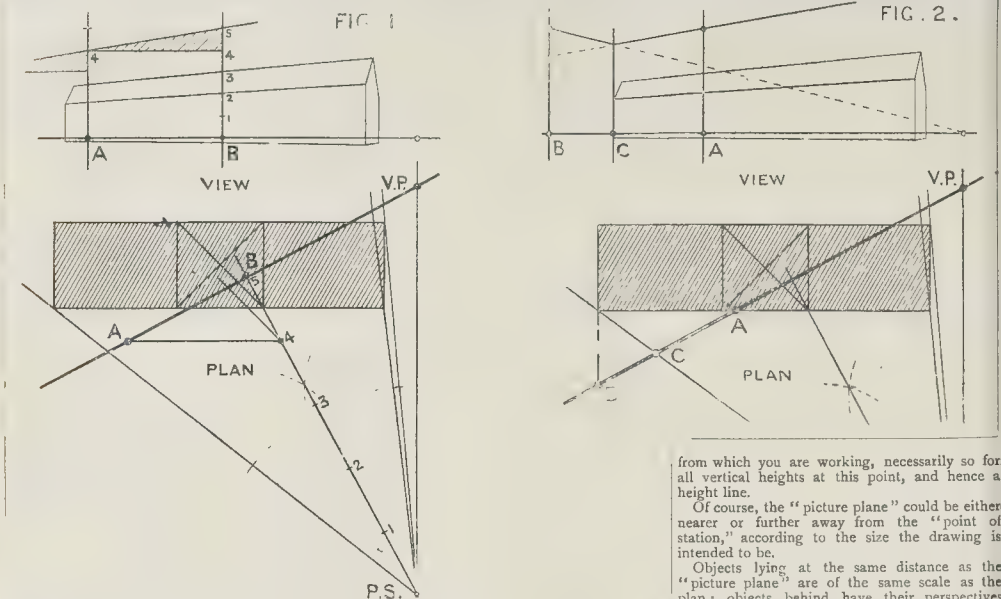
Mr. W. S. Weatherley then read the following paper on "Architectural Perspective."

The making of an architectural perspective mostly presupposes the drawing of that which does not yet exist, and, one may add parenthetically, never may exist.

Thus it is that the perspective has to be worked from geometrical drawings, from plans, elevations, and sections, and I expect I have been asked to try to tell you to-night what I can about the methods I have used: the practical rather than the theoretical side of the question: at least this is the interpretation I have put upon the invitation of your Committee. I do not think I need apologise for doing so when we consider that the scientific side has so often to admit the absurdity of its results; in fact, I very much doubt whether perspective can, strictly speaking, be brought down to rules, certainly not hard-and-fast ones, for there is scarcely a rule but has to be broken, and, therefore, the best course it seems to me is to be thoroughly grounded in a few broad principles which must be used with a large proportion of that useful article known as common-sense.

The very first day of my pupillage I was set to work upon perspective, and this without any previous knowledge from books, and a very fortunate circumstance I have always considered it. I doubt much whether anybody ever learnt from books alone anything of practical use; those I have met who have tried have certainly failed.

Two books I have lately looked through, one "Modern Perspective," by Mr. W. R. Ware,



published at Boston, U.S.A., in 1883; the other, a more recent publication, I believe the very latest, and in the library of the Institute, to which I shall presently refer.

The first book is a scientific and practical work written in precise and clear language. I am bound to say it interested me greatly, for Mr. Ware was an old member of the Spring Gardens Sketch Book. It almost seems as if some of the dodges in use when I was with Sir Gilbert Scott might have originated from him. For instance, what he calls in his book the "method of diagonals" and the "method of triangles."

It may help you to understand my subsequent remarks if I just run through the terms used, more or less customary no doubt, when working from a plan.

1. *Point of Station.*—The point where the spectator stands, i.e., the eye of the spectator.

2. *Visual rays.*—Rays from the point of station.

3. *Centre visual ray.*—A line from the point of station bisecting the angle formed by the two extreme "visual rays," forming, in fact, the centre line or focus of the perspective view.

4. *Point of Sight.*—The point where the "central visual ray" first cuts the building.

5. *Picture Plane.*—A line or vertical plane at right-angles to the central visual ray (used with reference to the plan).

6. *Vanishing Points.*—Points at which all lines that are in reality parallel must vanish.

As a rule vanishing points are on the horizontal line.

In what is called parallel perspective, where one side of the building is parallel to the picture plane, and therefore has no vanishing point, the vanishing points for the other sides will be found to coincide with the point of sight.

7. *Horizontal Line.*—This is always the level of the eye (used with reference to the perspective).

8. *Height Lines.*—Lines erected vertically on the horizontal line for the purpose of measuring off the heights to the same scale as the plan.

I think I can best illustrate these if I take the "point of station," "visual rays," and the "picture plane," and apply them.

For a beginner it is by far the better way, in my opinion, to determine the "point of station" on the spot, and to do this you must select a building which exists, and of which you must also have the geometrical drawings.

There will be some important feature you wish to emphasise in your view; see that this groups with the other features, and whether improved by standing rather close in or further away; then notice where your eye appears to rest, looking full to the front—the central visual ray forming as it were the focus of your view, and then imagine between yourself and the building a sheet

or plane of glass—the picture plane—upon which you might trace the view at once, every line vanishing to its proper vanishing point. The distance between yourself, that is, the "point of station," and the sheet of glass is a movable feast, and only affects the size your tracing would be.

I am aware the picture plane is an artificial invention, for no doubt we view things as seen upon a surrounding transparent sphere, as if we stood in the middle of a gigantic soap-bubble. When you have these things determined and fixed in your mind, transfer them to your plan to the same scale as your plan, and you will have learnt some vital requirements which give you successful command for all that follows.

If the building does not exist, or you cannot get to it, you must go through the same operation in imagination, using the plan and other drawings, bearing in mind that from the "point of station," as far as the building is concerned, the eye can only take in an angle of about 60 deg., that is, 30 deg. either side the central visual ray, and this applies also to vertical heights with certain modifications, such as the upper part of spires, which may somewhat exceed this angle.

We know, therefore, pretty much how near we may stand in, and how far off we stand in, governed somewhat by the nature of the building, whether picturesque or severe in character; standing too near brings about an acute result, too far a tame result. As a rough general rule, the distance from the nearest angle of the building is found to be about one and a half to twice the width comprised between the two visual rays that cut the extreme points of the building on the "picture plane," but there is no golden rule; it is a matter of judgment which experience alone can teach, and it can most easily be acquired by working back from an existing building, and for a beginner it enables him to identify and realise what the "point of station," "central visual ray," and "picture plane" really are when drawn on the plan.

To exemplify this, and to show how easily everything else follows—vanishing points, horizontal line, height lines, &c.—I will take a simple case, such a building, for instance, as the Cloth Hall, at Ypres, in Flanders.

This, as you know, is a building with a façade some 460 ft. long, flanked by two corner turrets, and with a central tower 230 ft. high.

Suppose we stand about 650 ft. away, determining the position and distance for the reasons already stated.

From the "point of station" draw lines or rays to the extreme points of the building, bisect this angle, the bisecting line being the "central visual ray," and then draw the "picture plane" at right-angles to it, and the point where it cuts the building will be the same scale as the plan

from which you are working, necessarily so for all vertical heights at this point, and hence a height line.

Of course, the "picture plane" could be either nearer or further away from the "point of station," according to the size the drawing is intended to be.

Objects lying at the same distance as the "picture plane" are of the same scale as the plan; objects behind have their perspectives smaller, being conically projected forward upon it; and objects in front have their perspectives larger, being conically projected backward upon it.

The "picture plane" is the line upon which all perspective widths and depths are measured; the measurements being taken from just where the lines or rays drawn from the "point of station" or the eye to any point of the building cut the "picture plane." Whether the "picture plane" is behind the plan of the building, and the rays have to be extended—conically projected backward upon it—is immaterial, and I may remark in passing that I have found it convenient to draw the rays without reference to any points on the plan, except perhaps a few salient ones, drawing them pretty closely together, if in ink on pencil then occasionally a red one among them, and by doing so you will find the eye will readily follow any point on the plan, either up or down to the "picture plane," and then can be measured off with more accuracy than if the rays had been drawn to each particular point; and the rays need not be drawn further than you like on the "point of station" side of the "picture plane," nor beyond the limits of the plan on the other side, unless additions are likely to be made to the plan in the fore or back ground; the object being to get all your leading lines from the plan on to the "picture plane," and thus *have done* with the "point of station," and you will be very glad to do so, as it is mostly a long way off the paper, and very probably the drawing-board.

The next thing to do is to find the vanishing points, and this is simply mechanical, because, having arrived so far, they give themselves, thus—draw a line from the "point of station" parallel to the side of the building for which you want the vanishing point, until it cuts the "picture plane," and where it cuts it will be the vanishing point required, and it can be measured off, say, from the "central visual ray," and transferred to the "horizontal line"; and, if you remember that all lines in reality parallel must vanish to the same vanishing point, it will clear up any confusion that might at first arise, for you have only to repeat this operation for any side of your building at whatever angle it may be.

"Height lines" can be erected on the "horizontal line" at any point where the building cuts the "picture plane."

If the "height line" is wanted at a part where the building is beyond the "picture plane," on the "point of station" side of it, all you have to do is to produce upon your plan any side or face of the building in the same straight line until it cuts the "picture plane," and at the point where it cuts set up your "height line," and measure your heights upon it to the same scale as your plan, working back your heights to their vanishing point for that side of your building just produced until they cut the desired parts.

It was while struggling with the difficulties of an exterior and uncertain as to "height lines" that a fellow pupil turned round on his stool and holding up about three-quarters of the length of this pencil, asked pathetically whether that was a fair height for the spire.

You will find in practice that it is best to make a height line do as much work as possible, and not employ too many; you will soon find out what is best to be done as the cases arise.

The rules which I have run through and explained by the diagrams are sufficient to enable you to make an architectural perspective, but their extended application is more intricate, and herein lies the resource and skill of the draughtsman.

Before attempting to describe any of these refinements, I will just refer to the second of the two books on perspective I looked through, the one recently published. If you come across it you will know it because in every diagram the "picture plane" is drawn in no case at right-angles to the "central visual ray," the necessity for which cannot be too strongly impressed, otherwise the perspective will be distorted. I remember the street front of an otherwise fine drawing, outlined for Mr. Brewer to colour, having the appearance of looking round a cone. I believe in this case the temptation was to show deeply-recessed arches, and at the same time convey the effect of great length to the reader.

Another singularity in the book is that the picture plane is always drawn as touching the angle of the building nearest to the "point of station," and this is taken as the height line for all the vertical heights. Neither of these cases is wrong, but the former restricts the size of the drawing, and fails to impart very necessary information, and the latter in practice would not simplify at all to inaccuracy. No warning is given about an angle of 60 deg. or any other angle being all that can be included, nor a limit of how to avoid the extremities of a building becoming distorted.

I think I need not mention the author's name, for you will not require to seek a book, and I have told you how to know it could it happen to fall in your way. I have been showing how to find the vanishing points, and for those that come upon the paper or drawing-board upon which you are making your perspective you cannot do anything better or have them more conveniently to your use; but for those that come a long way off and are outside a drawing-board it is not worth while to find them at all. The vanishing points are of no use; it is the angle at which the lines vanish that is wanted, and this can be found in several ways, thus:—

Divide the distance on your plan between the point of station and the "picture plane" along the "central visual ray" into, say, five equal parts, and from the fourth part counting from the point of station, produce a line parallel to the line of the building for which you require the vanishing angle until it cuts the "picture plane," erect a vertical line A at this point, and also a vertical line B where the "central visual ray" is the "picture plane": both lines the same, and of any convenient height. Divide the line B, which is the "central visual ray," erected vertically, into five equal parts, being the same number as you have already divided the distance between the "point of station" and the "picture plane," and from the top of the fourth division draw a line parallel to the "horizontal line," cutting the line A. If a line be then drawn from the point at the top of the fifth division on the line B to the point where the line parallel to the horizontal line cuts the line A, it will form with the "horizontal line" the perspective angle required. If I complete the process through the divisions you will see that each of the right-angled triangles is, as far as their sides are concerned, one-fifth the length of the total angle.

Or you may divide both vertical lines A and B into five equal parts, and, having done so, draw a line from the top of the fifth division on the line B until it cuts the line A at the top of the fourth division, and the same result will be obtained. This line, if produced, cuts the "horizontal line" at the "vanishing point" for the side of the building with which we are dealing. A centroline can be set to the above perspective angle—that is if you use one, I have not for many years—or you can run the line to the edges of your paper, and form a scale on both sides; then the left or right hand one or both may be some definite scale upon which heights may be measured off.

Another way of getting at the angle for the far-vanishing point, commonly practised at Scott's, is to erect two vertical height lines on the

"horizontal line" one, A being, say, where the "picture plane" cuts the side of the building, having the far-vanishing point and the other B where a line produced at right-angles to the same side from any point some way down the side cuts the "picture plane." Then we should set up equal heights on both, and run the far one B down towards the near vanishing point, which you must have already found and marked on the "horizontal line" until it cuts a vertical line C, erected over the point on the "picture plane," where the "visual ray" from the "point of station," cuts it on its way to the point from whence the line which gave the point B was produced. Having done this, draw a line from the top of the height line A to the point where the height line B cuts the vertical line C, and you will have the perspective angle given you.

A very foolish way, but gravely undertaken in my pupilage days, was to produce the "picture plane" and a line from the "point of station" parallel to the side of the building having the far-vanishing point until they met; not infrequently through a doorway from one office to another, and for this purpose we kept a huge ball of string. Then the angle was taken, the centroline set, and the view begun.

I recollect during my pupilage making a perspective for a competition of the exterior of a building in Mark-lane. We fixed the "point of station" some 300 ft. away, on the other side of the Lane; and the vanishing point for the front was found by the means I have just described.

The above illustrates the fact that architectural perspective is full of alternative methods, and he is a wise and perspicuously happy man who knows the best of them.

Then there are the very useful, in fact indispensable, 45 deg. vanishing points: these are found in precisely the same way, that is, a line parallel to the 45 deg. side and drawn from the "point of station" until it cuts the "picture plane," and then transferred to the "horizontal line." The far one can be got from one of the divisions on the "central visual ray" on the principle used for the far vanishing point of the building.

For diagonals of towers, for the setting out of pavements, divisions of bays, and for the sides of octagons, &c., these points are, as I have said, indispensable.

When a 45 deg. vanishing point comes very near the "central visual ray," it is not of so much use for objects near the centre of the composition, because the angle it makes with the vertical lines is so acute.

Vanishing points for an angle of 60 deg. are obtained in the same way, and are, of course, required for hexagonal forms.

Up to the present I have been chiefly referring to exterior views, but the methods hold good in the main for interiors, bird's-eye views, and what Mr. Ware alludes to as toad's-eye views.

Interiors are frequently drawn in what is called parallel perspective, in which, if a parallelogram, then one side of the building is parallel to the "picture plane," and therefore without a vanishing point, and the vanishing points for the other sides coincide with the "point of sight." It is a mistake to let the "point of sight" be exactly in the centre, but it cannot be very much out of the centre if the view is to be kept in parallel perspective. Mr. H. W. Brewer's very fine interiors are mostly drawn in this way. Personally, I prefer using angular perspective or a judicious blend, for instance, in the near parts where the horizontal lines are obviously getting out of perspective, such as to the beams of a roof or to the pavement.

Interiors require management; you may have, for example, the abacus of the capitals on the flanking sides, as they get near you, looking as if they skewed upwards and outwards, although in reality drawn perfectly horizontally.

Or, again, you may have, at the far end, an arcade opposite you in which the columns, as taken from the "picture plane," get wider the further they extend to the right or to the left. I need scarcely say these sort of things have to be corrected to what will satisfy the eye, which you must not forget an outsider possesses and uses with critical effect.

Interiors admit of some considerable scope in the latitude and flexibility of perspective rules. Really a very beautiful drawing made to show the octagonal central hall of Sir Gilbert Scott's design for the Royal Courts of Justice is probably unique in this direction, in that it shows seven sides of the octagon! The perspective is reduced, and forms the frontispiece to the second volume of Sir Gilbert Scott's Royal Academy Lectures.

Bird's-eye views have the "horizontal line"

high up, fixed according to the range of view required; they are troublesome drawings to make, and the vertical heights have a tendency to look too high. The best advice I can give you is to place yourself a long way off and a good way up.

Toad's-eye views, to quote Mr. Ware again, are luxuries, except in a mild form; they are, as their name implies, the converse of a bird's-eye view; the mild form is when a building is on rising ground some 30 ft. or so above the eye.

I remember going in for the Preston Hotel competition, the site being some 40 ft. above the surrounding grounds, which I well knew rose rather swiftly to the plateau for the hotel. I roughed out a view, putting the building 40 ft. above the horizontal line, deducting nothing for the level of the eye, and the result was as if I had placed it on a mere hillock, and before I got the appearance I knew it ought to have I had to add another 25 ft.

Every one who has gone through some such experience must be quite aware of the result. What may be the explanation I hardly know, but it is, I think, one of the many illustrations of the attempt to reduce an art to abstract rules which have been pushed too far. As a matter of fact, when we look at a building on a hill we do not keep our eyes fixed into the hill-side 5 ft. more or less above the ground we happen to be standing upon. This is, however, what the rules of perspective compel us to do. In looking at a building on a hill the "central visual ray" is really thrown up; the "picture-plane," to be at right-angles, is tilted forward, and, as a consequence, the vertical lines vanish upwards. Any one who has stood close under a hill and sketched some tallish building on the summit cannot fail to have drawn the vertical lines converging upwards.

There is something very odd about mountains and hills, for if you made a model to scale, for instance of the Snowdon range, you would find the mountains looked mere absurdities; and it is partly for this reason that engineers and surveyors adopt two scales, the larger one being used for the heights.

During my pupilage, I was lent out to Messrs. Bodley & Garner, and from them learnt to work perspectives with two scales, one scale having a twelfth added and used for all vertical heights. For interiors you will find this gives a much juster representation, which you can prove for yourselves from an existing building.

The use of diagonals is one of the simplest and most accurate ways of finding centres, or dividing up spaces either in odd or even parts, in fact they can be employed in ways without end.

It is evident the diagonals of the squares, or in other words, the 45 deg. vanishing points, can be used in working out interior views in parallel perspective, so that you may practically dispense with the plan—for instance you can make a scale across any of the horizontal lines—suppose the total width be 25 ft., and your bays are 15 ft., all you would have to do would be to divide the width into twenty-five parts, take fifteen of them, and by means of the 45 deg. vanishing points, mark this off on the perspective side, and then you have the 15 ft. bay in its perspective length. This principle admits of unlimited extension, so that for widths and depths it is quite unnecessary to consult the plan other than to know the actual dimensions.

This method is, I believe, largely taught among drawing-masters, and adopted by painters and others who will not or cannot understand a plan. I don't think an architect would take kindly to it, and it is useless with angular perspective and for exteriors.

Mr. Ware describes a method of triangles which he considers a more direct application of the same principle. It is undoubtedly more direct, and it can be used with advantage when the vanishing point of the third side of the triangle comes conveniently on the drawing-board, otherwise it is a bother, and the ordinary use of diagonals is practically less trouble. Diagonals are also absolutely necessary for putting in circles, either vertically or horizontally, or arches in perspective.

You will find the curve on the far side of the arches can for all practical purposes be struck on a line parallel with the "horizontal line," that is at right-angles to a vertical line from the perspective springing.

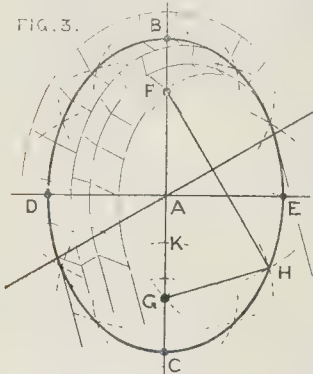
The near side is always a compound curve in drawing; it can be drawn by the hand, struck in by compasses, or by means of curves. Remember that both sides of the arch are parts of an ellipse. I am, of course, now speaking of arches composed of segments of circles. Remembering this helps the draughtsman to give the right swing,

and to know instinctively how the curves in perspective ought to look, especially for the near side, which is the difficult one.

With respect to circles in perspective, there are two aspects which do not require extraordinary skill to depict, that is when it happens to come a circle pure and simple, or a straight line, *every other aspect* is an ellipse, but this is cold comfort, for it is almost more trouble to draw an ellipse, irrespective of the difficulty of finding the perspective angle of the major and minor axes; still, it is useful to know how to draw an ellipse, because it helps, as I said before, to give you the right swing.

To draw an Ellipse. Let BC be the major axis, and DE the minor, bisecting one another at A. From D or E, with the radius AB or AC, strike the circle FGH, GF cutting the major axis at F and G (these are the foci). From G strike

FIG. 3.



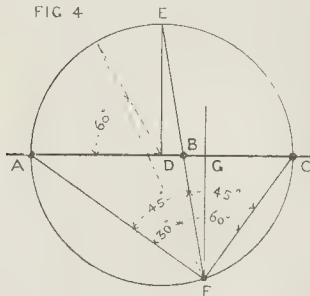
a circle with any radius less than AC, say GH; then measure off this radius on line CB, from C, at K, as shown. From the centre F, with radius equal to BK, strike a circle, cutting the other circle at H. Find any number of points such as H. FH and HG are together equal to CB.

A sphere, if drawn according to the rules of perspective, becomes an ellipse, whereas spheres under all conditions are as round as a ball.

To work out the "point of station," scale and plan of a building from a photograph or perspective is sometimes of great service. The following is the method I use:—Find three vanishing points, one being a 45 deg. vanishing point, or any known angle vanishing point.

Let A B and C be the three vanishing points. B being a 45 deg. vanishing point. Bisect AC at D, and describe the circle AEC. Make angle ADE equal 90 deg. or twice angle of 45

FIG. 4.



eg., join EB, and produce to F. Draw FG at right-angles to AC. F will be "point of station," FG the "central visual ray," and AC the picture plane.

Angle EFC equals 45 deg., EFA equals 45 deg.—Had ADE been made 60 deg., or twice 30 deg., EFC would equal 60 deg., EFA equal 30 deg.

The scale must be determined from some parts of the building the actual sizes of which one either knows or can arrive at from internal or external evidences, such as the courses of brickwork, figures in foreground, height of steps, lengths of down-spouts, and various other ways. No architectural photograph should be taken without a vertical scale against the building.

English photographers are more negligent in this matter than those abroad.

It is a pity the architectural perspectives at the Royal Academy Exhibition become more and more the work of a few specialists. I admit the difficulty for an architect whose time is fully employed being able to make his own views for exhibition; it is a subject that crops up for discussion every now and then. I can bring to mind a view of the entrance tower and semicircular wing of the Midland Grand Hotel; it was on two sheets of antiquarian paper joined. I was making it just at the time of an outcry that all works submitted to the Royal Academy should be the actual work of the exhibitor, and it moved Sir Gilbert Scott to write to the President pointing out that an assistant of his had spent about a fortnight on his stomach, and asking whether such a penance was required of him. This recalls an experiment made about this time in one of the rooms at Spring Gardens, and the sight of three or four men trying to do their work with maul-stick and easel, some even perched on their stools on the desks.

I have been pleased of late years to see an increasing number of pencil perspective drawings; it is a charming medium for not too large views, and is, I find, very much appreciated by one's clients. The difficulties of reproduction, which no doubt formerly stood in the way, have been quite overcome.

The sway of the architectural colourist is a thing of the past. But twenty years ago or so, although Sir Gilbert Scott loved a pen-and-ink drawing, with detail and carving put in with almost microscopic minuteness, and although Mr. Street was astonishing everyone with his powerful common ink perspectives, still it had hardly become safe to submit a set of competition drawings without a coloured view, and Thomas Allom, who years past wielded the magic of his brush, was induced to take it up again and finish in water-colour the exterior view of Sir Gilbert's design for the Berlin Houses of Parliament. This was in 1872, and Thomas Allom must have been close upon seventy years old; in fact, he died in October of that year. I do not know whether I may venture to suggest a direction for your studies, but it has always seemed to me that Canale's views at the National Gallery, such as the Scuola di San Rocco, the Piazzetta di San Marco with the Campanile, and the Grand Canal, Venice, afford magnificent lessons. The draughtsmanship is something astonishing, and although the rules of perspective have played him false occasionally, we must remember they were done about 1750, about the time Sir William Chambers made his design now in the Diploma Gallery of the Royal Academy, which is very much out of perspective.

Perhaps I ought to briefly refer to cast shadows. All you have to do is to fix the position for the sun, and work out your shadows from it on the lines I have described, treating the sun as a "point of station," and drawing rays from it and transferring them to your view. One caution I can give you, avoid a mid-day sun in the northeast! A drawing of mine, showing the east end of a large church, was beautifully coloured by a well-known hand, with light and shade coming streaming from the north side, producing fatal results; the committee revelled in discussing the phenomenon, and as you have probably surmised, another design had to be made before the work was carried out.

I am bound to say I have no sympathy with the labour involved in working out shadows to the utmost nicety, such as we see in Academic drawings, or among French geometrical drawings. If you examine some of Mr. Norman Shaw's delightful drawings, you will find the shadows thrown from any side, or both sides, of the views. I only point this out, and must leave you to become disciples or not.

A fashion in my pupilage days was to elaborate the sky, spending a day or so on a transcript of one of old Cotman's skies; not always with success, as the remark "that clouds are generally some way off" would testify.

Nowadays a few whiffs of cirrus clouds are all that is thought necessary. The fine old historical competition skies, which were considered to be half the battle, have ceased to be.

The means employed to counteract optical effects one learns possibly irrespective of perspective drawing, but a perspective to a large scale is the most certain way to make sure as to what should be done. No tower, or spire, or other isolated feature should be designed and executed from geometrical drawings alone. Think of the batter to the upper stages of a tower, of the entasis to a spire, of the projection of

cornices, and how immensely important these things are.

If the designer of the Tower Bridge had made a perspective to a sufficiently large scale of one of the towers the unhappy appearance of the angle turrets, which seem to be falling outwards and the finials flying away, might have been avoided, and then there would have been two mistakes the less to add to the list of its architectural follies.

I may just say a word about "cooked view." If for instance it means the rectification of the rules of perspective, or their modification, such as working from a second point of station, which is an attempt to meet what in reality is instinctively done by the eye to get a better view of any particular part, or raising the horizontal line for foregrounds and desperate expedients reducing the scale by one half for the human beings and other animated nature; then so far, believe, most of us are sinners, and I think it practice can be at any rate defended, but a defence is not possible in cases such as adding another bay to the nave arcade! a clumsy, and, I hope, obsolete dodge; or an extra 50 ft. in the length of the chancel so that it may be seen beyond the tower; nor to falsifying a drawing so grossly, as the one recently exhibited in this room, and subsequently at the Royal Academy. I mean the Tower-street front of University College extension. It was exposed at the time it hung here and it should then have been withdrawn.

If all architectural perspectives had a plan to small scale in the corner, it would not only check upon the information given, but be a check upon a too elastic idealisation of matters fact.

I have said scarcely anything about the draughtsmanship of architectural perspective, nor have I submitted any drawings in explanation of my remarks with this intention. The ability shown by the rising generation is far and away beyond anything dreamt of in my scholastic day. I hope I may not have disappointed you by the omission; it would, I think, have been most symptomatic in me, and unprofitable for you had I done so. If, however, I have been able to give you a few practical hints, I shall feel myself amply rewarded, and shall congratulate myself upon escaping the mere repetition of an "old-tale."

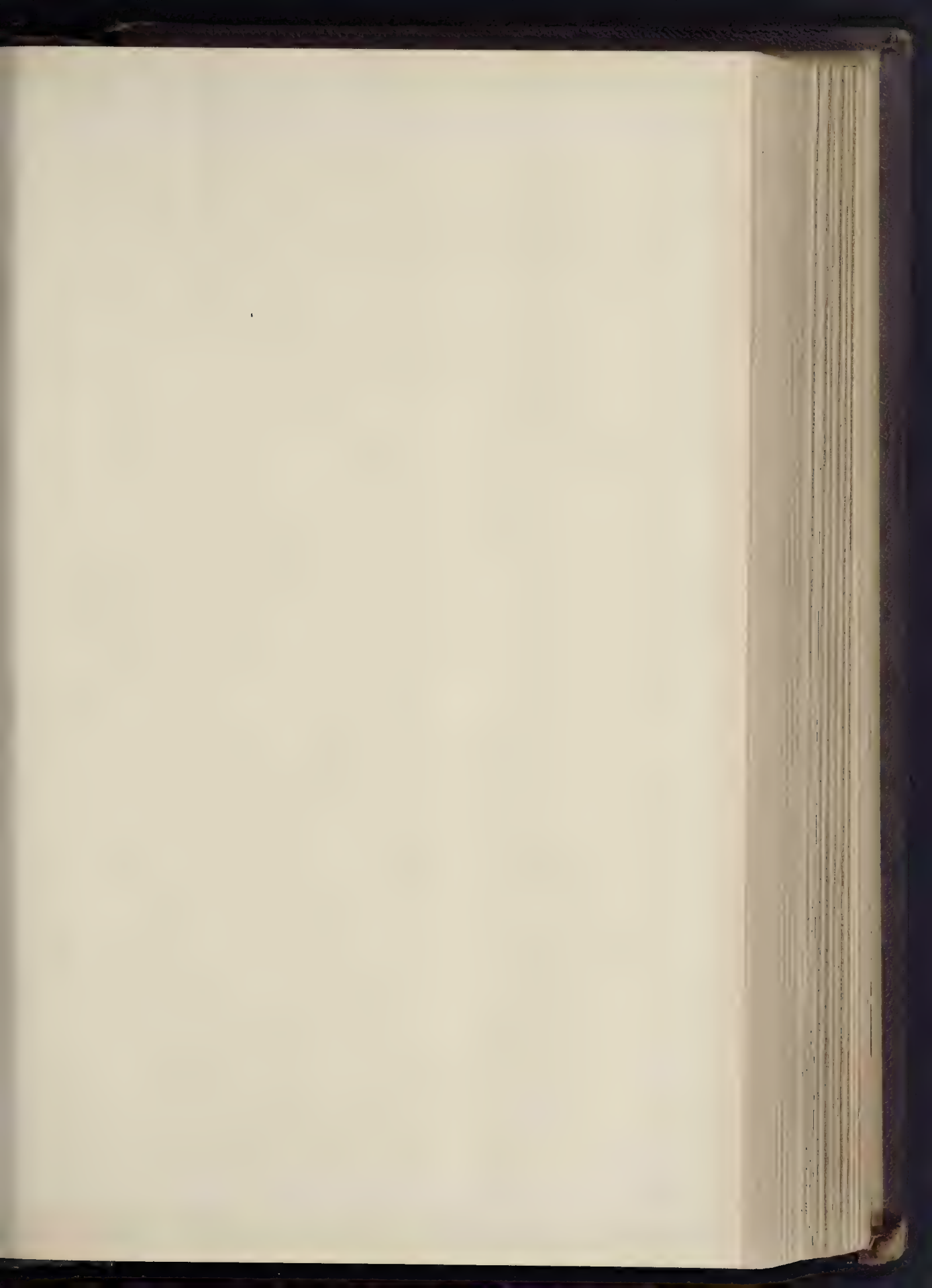
Mr. R. Phéné Spiers said that a discussion lecture on Perspective always seemed a little more difficult than the subject when they began to work. It was the custom in French architectural drawings to use the actual shadows, and could only account for that from the fact that the Frenchman was so accustomed to use shadows. Geometrical drawing, that he considered his perspective drawing would not be complete without the same class of representation. There was no doubt that sometimes good drawings had been made with the sun coming from two directions. The lecturer had been somewhat hard on the painters. The architect had to prepare his plan and his elevation, which was not likely to happen to the painter. The whole essence of perspective was the connecting of a number of points by means of intersection. The intersection of two lines gave a point, and there were various ways of obtaining the direction of these. Architectural perspective was simple for architects, but not for painters. The architect, by putting his plan on the board and drawing lines through the picture to the points of distance, obtained a number of intersections, giving vertical lines, in a few minutes, but, in order to get the same effect, the painter had to work a long time. Therefore, a drawing which Mr. Weatherley would do in a fortnight would take a painter six months to complete. The lecturer had pointed out what he called "dodges," but these were merely the putting in practice the principles of perspective. Mr. Spiers gave several examples on the black-board, obtaining similar results to those attained. Mr. Weatherley, but by different means. I considered they were much indebted to the lecturer for coming forward with so elaborate paper, and concluded by proposing a cordial vote of thanks to him.

Mr. H. W. Brewer said it seemed to him that one of the great defects in all rules of perspective was that they made people draw as if they had only one eye, instead of two. That was especially the case with interiors; in fact, he had never seen a drawing of the interior of a church which gave such a view into the aisles as would be obtained in reality. The reason was that they were drawn according to the rules of perspective as seen by one eye, whereas the other eye shows

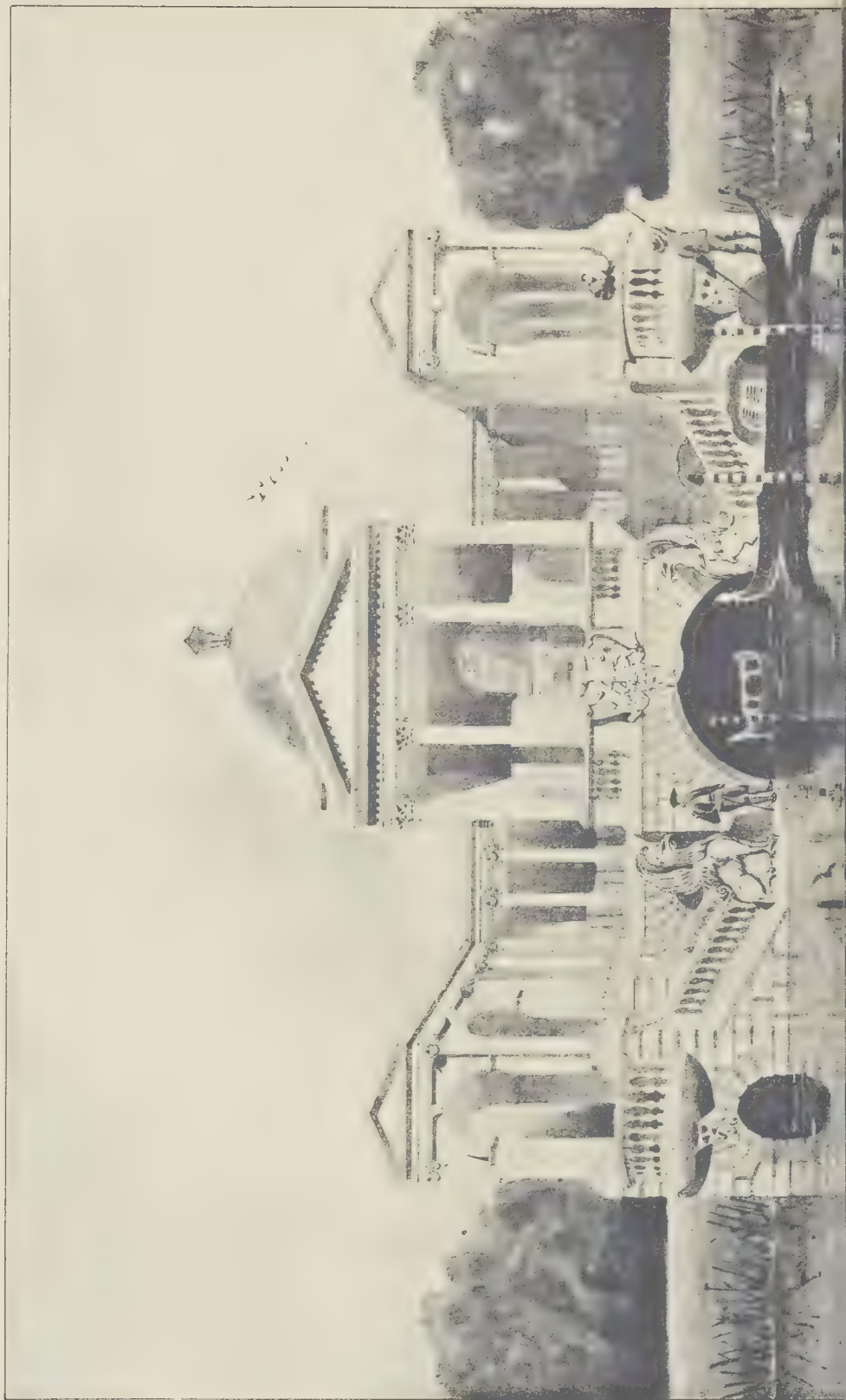
THE BUILDER, FEBRUARY 9 1895



PORCHES OF LONDON HOUSES. No 11. SEVENSON FRIBA. Architect

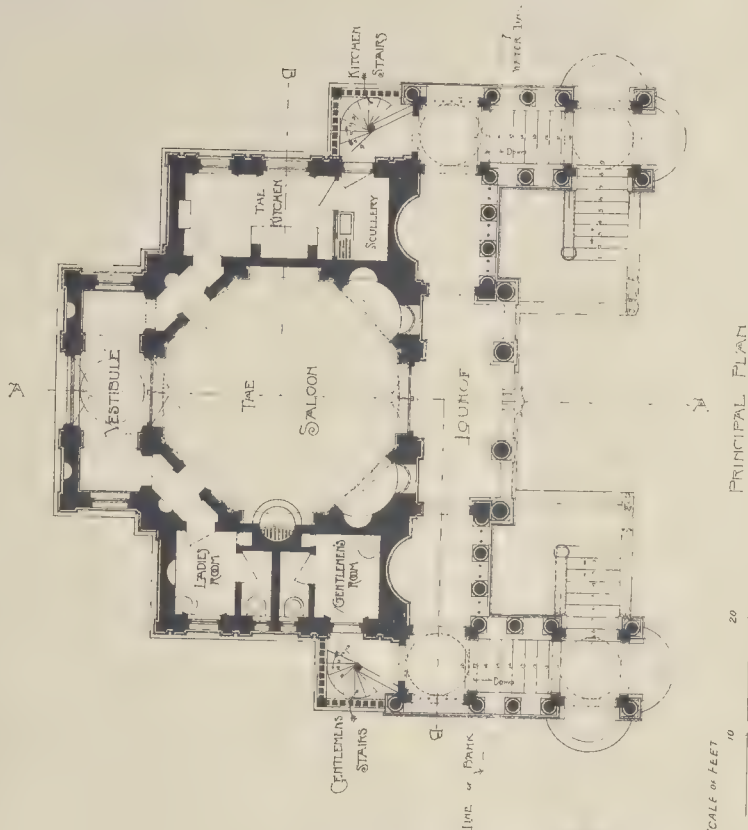
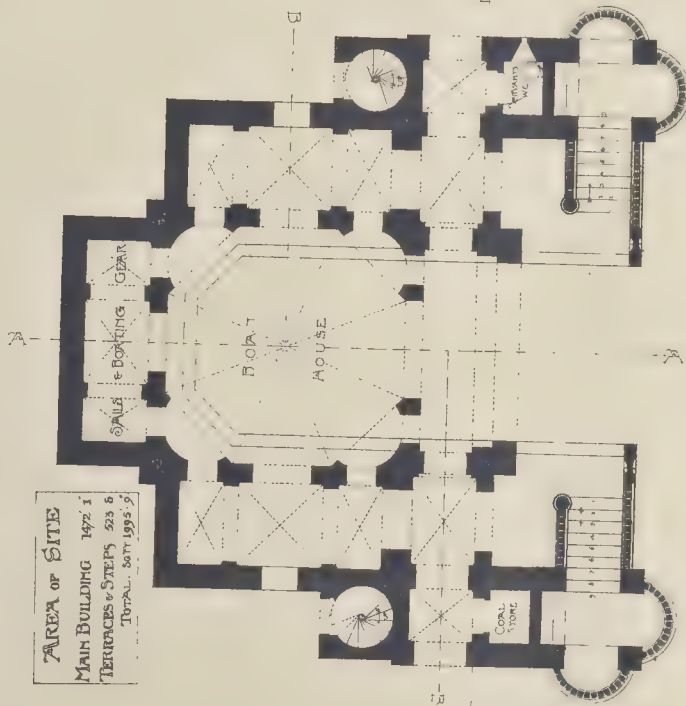


THE BUILDER, FEBRUARY 9, 1895.



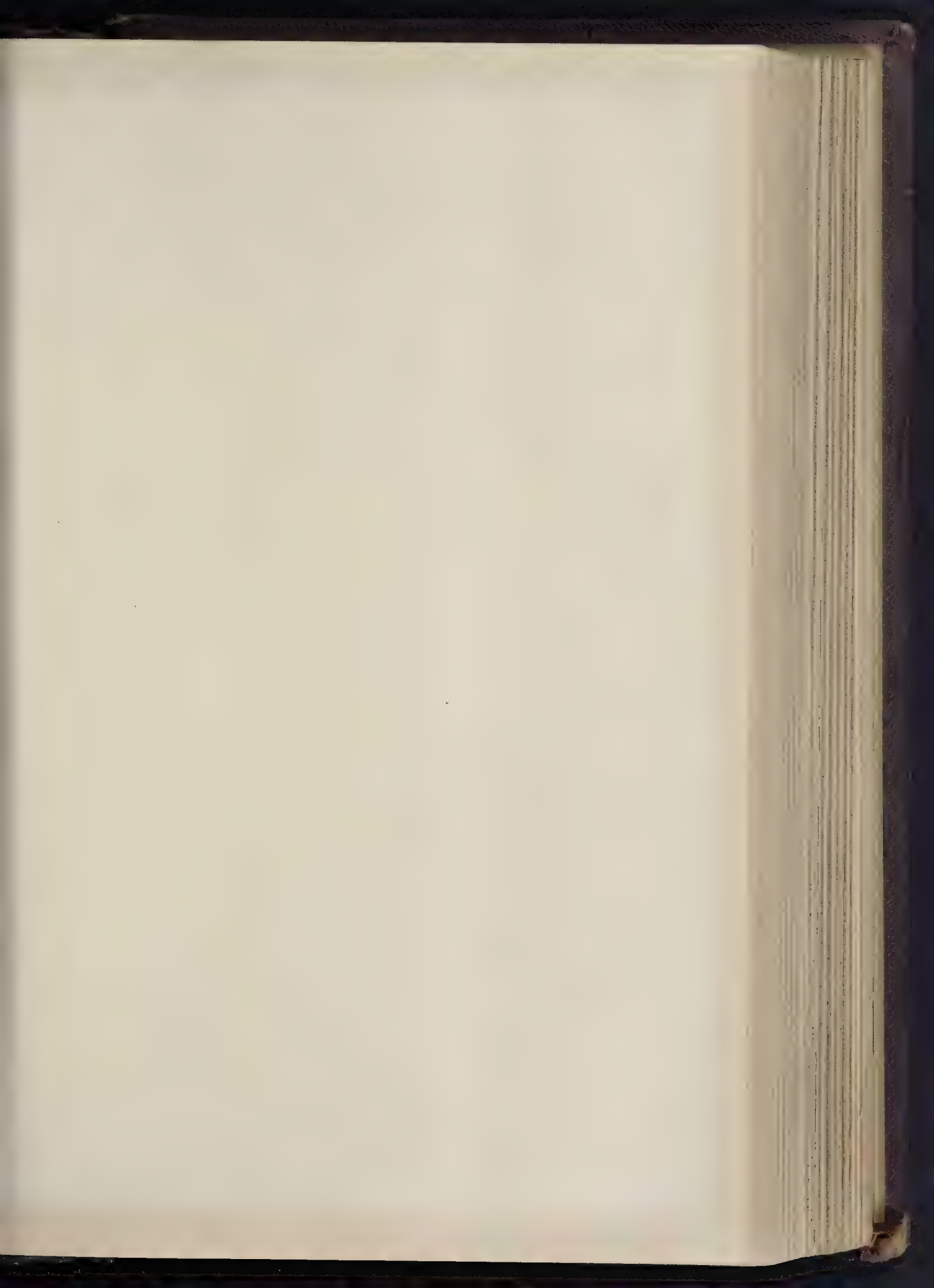
THE TITE PRIZE-RIBA A GARDEN PAVILION

AREA OF SITE
MAIN BUILDING 1472 1
TERRACES & STEPS 523 6
TOTAL, BOTH 1995 7



DESIGN WHICH RECEIVED THE MEDAL OF MERIT IN THE TITE PRIZE COMPETITION.

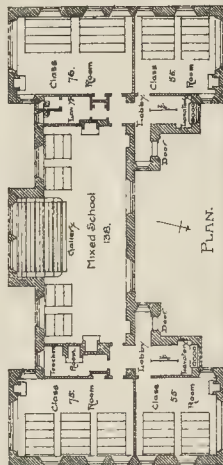
By MR BANISTER F FLETCHER, A.R.I.B.A.



Book 111

BATHGATE · LANDWARD · SCHOOL · BOARD ·

J. Graham Fairley, F.R.I.B.A.
Architect



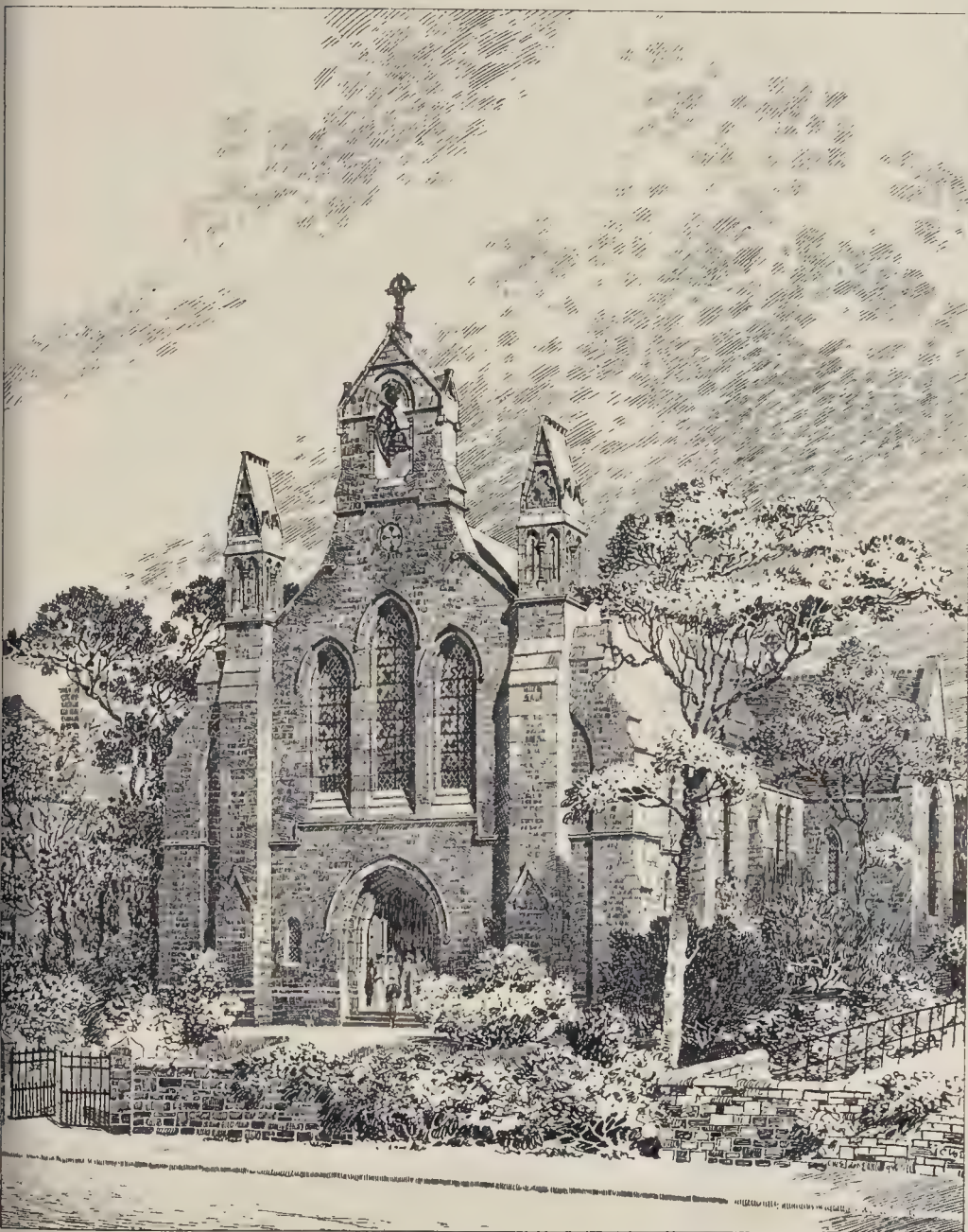
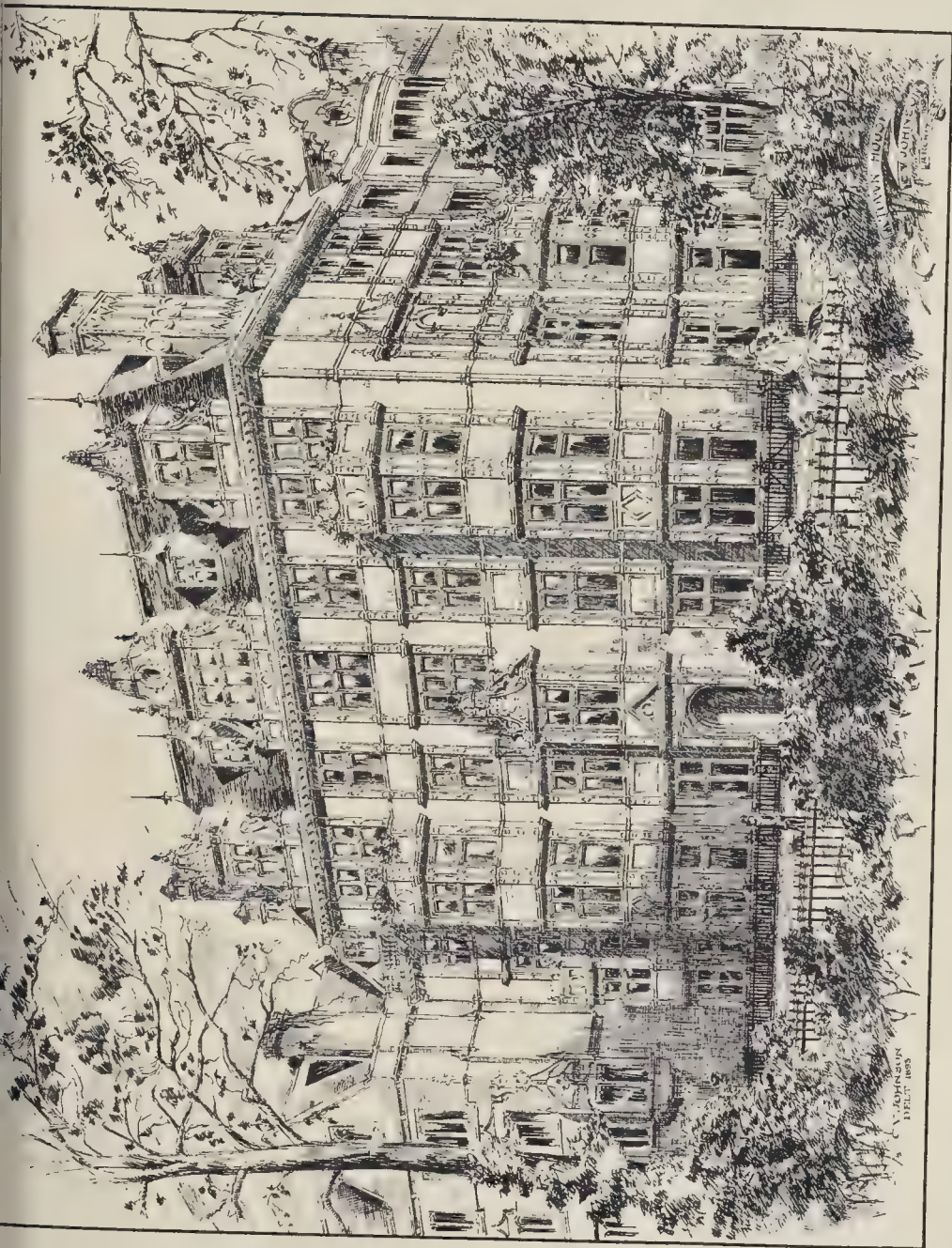


PHOTO-LITHO. SPRAGUE & CO. 4 & 5 EAST HARDING STREET FETTER LANE E.C.

VILLAGE CHURCH, BROXBURN, WEST LOTHIAN.—MR. J. GRAHAM FAIRLEY, F.R.I.B.A., ARCHITECT



A TOWN HOUSE—M. C. V. JOHNSON, ARCHITECT

help one to look into the aisle and see a little bit round the columns. Mr. Weatherley seemed to think that they should not always draw interiors in parallel perspective. It might be a piece of cowardice on his part, but he always avoided the two vanishing points in an interior; by them one obtained fearful distortion, especially in the vaulting. It looked bad when one got a boss which should be at the top of the arch, about two-thirds down one side. If they drew the interior of a church, as seen only by one eye, they would see it without being inside it, and would be, in fact, looking into the interior from the outside. In sketching, too, we should always do so with both eyes open. He was glad to find that the lecturer was not an implicit believer in the infallibility of the rules of perspective, and he (the speaker) would say unhesitatingly that one month's study from nature would teach more than three years' study of perspective from books. He did not say that they should not study perspective from books; they must do so if they had to set up drawings of buildings from plans; but it would be better to trust much more to experience gained by sketching from nature. He had gained a great deal of information from Mr. Weatherley, and it was very good of that gentleman to let out all his secrets in this way. He had much pleasure in seconding the vote of thanks.

Mr. A. B. Pite thought it was very good that a body of students should be brought face to face with a man like Mr. Weatherley in the midst of his work, who had been the means of imparting so much information through the illustrations of Sir Gilbert Scott's lectures. For a long time he had regarded those drawings as masterpieces of architectural illustration. Their clear and bold style would preserve to them a very high position as book illustrations of penmanship. He was inclined to think that, with all the processes and technical skill now devoted to the subject of drawing, they had not got a step beyond the point which the lecturer had attained in illustrating those lectures of fifteen years ago. He would also like to emphasise what Mr. Brewer had said about the importance of studying from nature, and the advice he would give was that all students should study model drawing before taking up architectural perspective. They would learn to picture the thing they were designing, as it existed, though, by mental habit, they designed in elevation or geometrically. If they got into the habit of designing their forms by sketching them as they would picture them to exist, they would find the designs very much more satisfying. They need not trouble about basilicas or temples; let them rather try cottage roofs, and learn to be impressionists as to the effect of their designs. With regard to the use of the two eyes, it was difficult to define how that could affect the lines of perspective, as the eyes soon made a common focus. They should learn to see the design of a building as it existed, and put it down on paper as such. Then the elevation should be drawn, and next the section. The elevation might then be put into perspective by someone else, and the two designs should be compared, and acted upon.

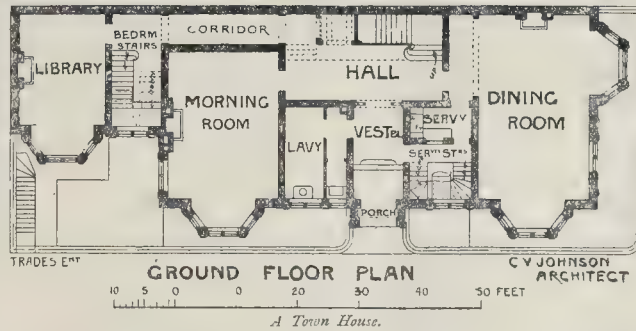
Mr. Paul Waterhouse drew attention to a page in Spon's pocket-book, which he had found of great service to beginners, giving as it did the first rules of perspective.

Mr. B. F. Fletcher thought it would be well if Mr. Weatherley would publish his lecture in pamphlet form, accompanied by the illustrations. He believed there would be a ready sale for it, and the young man, instead of attending lectures on the subject, would get, within a short space of time, all that he wanted. As an old Academy student he had attended lectures given by a great authority, and the one thing they seemed to impress upon him was that he would never learn how to put up a perspective drawing.

Mr. Arthur Baker, R.C.A., remarked that he had found the lessons given by Sir Gilbert Scott very useful.

Mr. Lewis said that it was essential to the man who wished to design anything that he should be able to see it by simply looking round the drawings. With regard to shadows, it required some considerable knowledge of geometry to treat them correctly; but if a man had studied buildings, and noticed how the shadows came, he could sketch them in very accurately.

The President agreed that they had had a very admirable paper and discussion that evening. In his experience of perspective, the correct representation of a fairly lofty tower was a considerable difficulty, because if set up according to the ordinary rules, the appearance of the upper part was always misleading. It would be found



that a tower which looked well in a perspective, would have to be considerably modified in execution if the same effect were to be obtained, the height having to be increased. This was because in the perspective drawing a foot in height had the same value at the top as at the bottom of a tower, while in the real building the result was very different. As regards shadows, he thought that the great charm of sketching was to have plenty of strong sunlight, for without well-defined shadows a building lost half its interest.

The vote of thanks was then put and carried by acclamation.

Mr. Weatherley, in replying, said that the processes described by Mr. Spiers accentuated what he had said, that perspective was full of alternative methods. With regard to towers, he was bound to say they were difficult to deal with in respect to the elevation. In transferring the perspective lines to the elevation an unsatisfactory result might probably be produced; in actual work it generally meant an additional height, with extra cost, unless foreseen and provided for.

The President drew attention to the paper to be read by Mr. Statham that day fortnight, which would be illustrated by lime-light views, and should prove very interesting.

The proceedings then terminated.

Illustrations.

PORCHES OF LONDON HOUSES.

THE porches shown in the side drawings of the sheet are from Buckingham Palace Gardens, a row of houses recently built by Mr. Willett on the Grosvenor estate of the Duke of Westminster. While the block forms one symmetrical design, individual character is given to each house by the variety in the entrance-doors and porches, instead of being recognisable, as is frequently the case, only by the numbers. The drawing in the centre shows the porch of Colonel Makins' house in Lowther Gardens, Queen's Gate.

The architect is Mr. J. J. Stevenson, and the drawings were exhibited at the last Royal Academy exhibition.

THE TITE PRIZE, ROYAL INSTITUTE OF BRITISH ARCHITECTS, 1895.

THE perspective view and plans published herewith were submitted in the late competition at the Royal Institute of British Architects. The problem was a garden pavilion overlooking a lake, containing on the water level a boat-house, and on the upper or principal floor, a saloon, vestibule, ladies' and gentlemen's retiring-rooms, and a small kitchen. A site of 2,000 sq. ft. was given, which was to include all terraces and flights of steps. The style was also dictated by the well-known rules of the Tite Prize. The plan seemed very naturally to group itself round the saloon or chief apartment as a central feature. This primary outline was square, the corners being cut off internally for passages to the ladies' retiring-room and to the kitchen, from the vestibule; the corresponding angles on the lake side, where an ample look-out is indispensable, being formed into alcoves arched over above, bringing up the whole to a regular octagon, expressed externally by a leaded dome crowned with a bronze tripod. For the purpose of convenience and isolation a small circular stair leads from the river bank to the gentlemen's lavatory, which is also reached from the end of the loggia, while a corresponding

stair is used as a retired access to the kitchen, thus obviating the necessity of using the front entrance for this purpose. The whole front to the lake is devoted to an open loggia, accessory to the saloon, and forming part of a grand approach from the water side. The covered colonnaded stairs built out in the lake enclose and contrast the main portico, and by giving extension to the design obtain as much length and lowness as was possible on the restricted site. The question of the scale of the landscape and trees was then considered, and an endeavour was made to give the design an English character; the little bridge at Prior Park, Bath, by Inigo Jones, having been studied as a motif for the enclosing colonnades. Such a building is the adjunct of an imposing Classical mansion, such as Holkham or Prior Park, and, therefore, simplicity in general treatment was sought after, while remembering that the building had to express itself as the luxury of a rich and noble owner.

BANISTER F. FLETCHER.

* * This design was placed second and received a medal of merit. We depart from our usual rule of not publishing a "second" design in a competition unless we have published the first, because, as we have already stated, we dissent from the decision of the Institute, and consider that this design should have had the Tite prize, as being both the best idea and the best plan submitted.—ED.

A SMALL ART SCHOOL FOR A COUNTRY TOWN.

THIS design is proposed to be erected of red bricks and a local stone. In the main building there is a lecture-hall 32 ft. by 21 on the left of entrance, and two class-rooms 21 by 16 on the right. At the back is a low-pitched wing containing ladies' retiring-room 17 by 14, and small rooms for professor and model, with cloak-room, lavatory, store for easels, &c. In the basement is the heating chamber and further storage for casts, &c. The caretaker has two rooms in the attic above entrance hall. The building is economical and unpretentious, though sufficiently suggesting its purpose. It is adapted also for small public meetings, or private concerts and balls. The estimated cost is about 1,200£. The design was exhibited at the last Royal Academy.

E. B. LAMB.

A TOWN HOUSE.

THIS house is designed for a corner site. The arrangement of the ground floor is shown by the plan given herewith. The basement contains housekeeper's room, footman's room, with ample cellars, and the usual offices of a house of this class. On the first floor there are three drawing-rooms and a boudoir, and on the other floors are arranged twelve bed-rooms, with dressing-rooms, bath-rooms, &c. The hall is top lighted. The elevations are designed for Ancaster stone, with green Westmoreland slates on roofs.

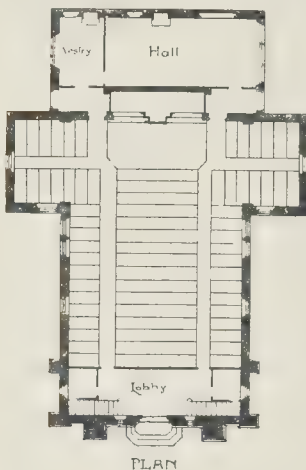
C. V. J.

INFANTS' SCHOOL, ARMADALE.

A NEW senior school for 450 children was built at Armadale, West Lothian, in 1879. The new infant school, of which we publish the illustration, is built on a site immediately adjoining, and accommodates 440 children, at an estimated cost of 2,500£. Mr. J. Graham Fairley, of Edinburgh is the architect.

VILLAGE CHURCH, BRONBURN, WEST LOTHIAN.

This church has been recently erected in the village of Bronburn, West Lothian, and is seated to accommodate 320, 282 on the ground floor and



Village Church, Bronburn—Plan.

38 in the gallery. The plan is appended. The cost was about £1,500.

The architect is Mr. J. Graham Fairley, and the drawing, together with that of the church above described, was exhibited at the last Royal Academy Exhibition.

CLERKS OF WORKS' ASSOCIATION: ANNUAL DINNER.

THE twelfth annual dinner of this Association was held in the Venetian Chamber of the Holborn Restaurant on Monday, Mr. F. C. Penrose, President of the Royal Institute of British Architects, occupying the chair. Among those present were Professor T. Roger Smith, Mr. J. M. Brydon, Mr. J. E. Drower, and Messrs. E. W. Nightingale, Stanley Clarke, T. Stirling, D. Charteris, and others.

The loyal and patriotic toasts having been proposed by the Chairman, Mr. Stanley Clarke responding for "The Army, Navy, and Reserve Forces," Mr. J. Wilkinson proposed the toast of "The Architects and Surveyors," coupled with the names of Professor Roger Smith and Mr. J. E. Drower.

Professor Smith, in the course of his reply, said both architects and clerks of works had similar duties to perform. Both alike were servants of the employer and were bound to look after his interests, and both were bound to see that fair play was given to all those engaged in the erection of a building. There was much in a building besides the solid materials—the bricks, stone, &c.; there was the labour, which was absorbed and embodied in the building, and practically there was nothing to show for that labour; but there was another contribution in every good building: an unstinted measure of thought and brain work, and there was something to show for that. Every skilled artisan engaged on the work contributed his proportion of that work, and if a particular building had anything about it that pleased or interested them it was owing to the thought and brain work which had been employed in its erection. The first duty, and the most difficult duty, of the architect was to imagine a building from nothing; but subsequently, when the building was being erected, the aid and supervision of men like clerks of works was indispensable to the architect, and where the clerk of work's supervision was characterised by intelligence, honesty, and uprightness, the result was of great value to the undertaking.

Mr. Drower responded for the surveyors, and in the course of his remarks said that by forming that association the clerks of works had shown themselves alive to the fact that the new race of clerks of works ought to have a more complete

technical knowledge of all branches of their work, and he congratulated them upon what he believed was a very successful association.

The Chairman then briefly proposed the toast of the evening, "The Clerks of Works' Association." Having referred to the position and duties of a clerk of works during the erection of a building, the Chairman said that there had been times when it was difficult to obtain suitable clerks of works, but that difficulty had been removed by the action of the Clerks of Works' Association, and that in itself was an excellent reason why architects should wish every possible success to that body.

Mr. E. W. Nightingale, President, responded, and in doing so referred to some of the objects of the Association, amongst which are the following:—To find employment for such members as may be disengaged, by calling the attention of architects and employers to the advantages of obtaining competent clerks of works; to establish a circulating library of suitable works on architecture and building for the use of the members; to publish a journal devoted to the interests of the Association; that there shall be no trade unionism in any form; that there shall be nothing of the provident or benevolent character about the Association, so that no restrictions as to age, &c., need be considered in the admission of members. He hoped that the difficulty which had formerly existed, of obtaining competent clerks of works, had been removed, as he thought it had.

Mr. W. S. Woolacott then gave the toast of "The Visitors," coupled with the name of Mr. J. M. Brydon, who, in response, said that this was an age of Associations, and he was glad that clerks of works had one to further their interests. But he should like them to associate for something higher than that. He was glad to hear that there was no such movement as trade-unionism in their Association. He should like to see trade unions and associations of all kinds unite to do thoroughly good work, for that, it seemed to him, was the weak point of a good many trade unions, though he hoped it was not of their Association. If their first object was to do good work, they need not fear for the prosperity of their country. No workman was worthy of the name unless he was conscientious, and it was on that conscientiousness, and the determination that between each of them they should produce the best piece of work in their power in the various trades with which they had anything to do, that the success of their work depended. It was his experience that by appealing to a man's conscientiousness much better work could be got from that man than by promising him a half-penny an hour more for his work.

Mr. J. Brady, the editor of the *Journal of the Association*, proposed the toast of "The Worshipful Company of Carpenters," and in doing so referred to the work of the Company in promoting technical education and to the assistance which they had given to the Clerks of Works' Association. The toast was coupled with the name of Mr. P. J. King, who briefly replied.

Other toasts were, "The Hon. Treasurer" (Mr. J. Oldrid Scott), proposed by Mr. F. Plowman, and responded to by Mr. J. Watson; "The Press," proposed by Mr. J. Davies, and coupled with the name of our representative, who replied; and "The Chairman," proposed by Mr. R. Wheeler.

THE SANITARY INSPECTORS' ASSOCIATION: ANNUAL DINNER.

THE twelfth annual dinner of this Association was held on Saturday last at the Holborn Restaurant, 164 members and guests sitting down together. Sir Benjamin Ward Richardson, the President of the Association, took the chair, and among the guests present were Sir J. Crichton Browne, Sir Jas. D. Linton, President Royal Institute of Painters in Water-Colours; Sir Thomas Crawford, Army Medical Department; Major-General Moberley, Professor D. E. Hughes, Dr. F. J. Allan, M.D.H. (Strand Board); Dr. Shirley Murphy, Dr. Lewis Thomas, Mr. Aubrey Richardson, Mr. H. Percy Boulnois, C.E., President Liverpool Branch. Mr. H. Thomas, Chairman of Council; Mr. Hugh Alexander, ex-Chairman; Mr. C. W. Raymond, and other members of the Council occupied the vice-chairs.

After a response to the toast of "The Army, Navy, and Reserve Forces" had been made by General Moberley, the President proposed the toast of the evening, "Success to the Sanitary Inspectors' Association." The work of the Asso-

ciation was passed in review by Sir Benjamin Ward Richardson, who warmly congratulated the members and the members of the Council on the excellent character of the work they had accomplished, the practical nature of their objects, and the steadfastness of purpose with which they had been pursued all through the twelve years of the Association's history, and he looked forward very confidently to their still greater success in the future. There were many points in the Association's programme still to be realised, and in order to attain them it was necessary that they should be united and work together in harmony, but with good hope for the future. Greatly to his regret, their class of Officers of Health had not yet achieved the position of importance of their work in securing the public health, entitled them to expect. He regretted, too, that a representative of the Association had not been put upon the new examining board, and that so many of them had still an uncertain tenure of their offices; but the good time was coming, and if they only held together, and continued their work in the same earnest spirit which had so far characterised their proceedings they were certain to succeed.

The toast having been duly honoured, Mr. S. C. Legg, who had fulfilled the position of honorary secretary of the Association from its foundation until the end of last year, was called upon to receive an illuminated address, reciting the many obligations the Society owed to their late honorary secretary, and to accept as a testimonial a purse and a marble clock, which bore the following inscription:—"Presented by the Sanitary Inspectors' Association at their twelfth annual dinner, held at the Holborn Restaurant, February 2, 1895, to Mr. Samuel C. Legg, late Honorary Secretary, together with a purse of gold, in recognition of his self-sacrificing labours, which have resulted in the establishment of this Association in the interests of Public Health."

In subsequently responding to the toast of "Literature, Science, and Art," proposed by Sir Thomas Crawford, Professor Hughes and Sir James Linton addressed the company. Professor Hughes anticipated a great future for sanitary science. Sir James Linton traced an intimate relationship between sanitation and art. The painter might fairly be included among the sanitary reformers, for his constant endeavour was to set up high ideals which might lead us to view all things with healthy and sanitary minds.

To the toast of "Local Government and Education," which Mr. H. P. Boulnois proposed, Dr. Shirley Murphy was called upon to reply.

The toast of "The President," proposed by Dr. Allan, was drunk, and briefly replied to by Sir B. W. Richardson. The toasts to "The Visitors," and "The Executive," followed, which were proposed or responded to severally by the Rev. G. Martin, Mr. Aubrey Richardson, Mr. H. Thomas, Mr. E. Tidman (hon. sec.), and Mr. H. Alexander. Mr. Aubrey Richardson referred to the natural desire expressed by many members of the Association, and of some of the provincial branches for closer union, and to the schemes which had been frequently discussed. A scheme had been many times considered, and it blocked the consideration of other important questions, such as that of an examining board. He desired to see the question settled one way or the other, in order that they might pass on to more important work.

Mr. Thomas, in his reply, referred to the action taken by the executive on the proposal of the Hackney Vestry to appoint a sanitary officer at the inadequate salary of 91*l.* a year—a proposal which they hoped the Local Government Board would not confirm; and they had heard indirectly that the Board would refuse its sanction to so low a salary as 91*l.* a year for the office. He concluded with an earnest appeal to all classes of Englishmen to help an association which was striving so earnestly to fulfil the objects for which it was formed.

The hon. Secretary, Mr. E. Tidman, in the course of his response, announced that the next provincial meeting would be held at Worthing at Whitsuntide, on the invitation of the Mayor, and he hoped they would all attend.

THE ARCHITECTURAL ASSOCIATION: SPRING VISITS:

NEW CHURCH HOUSE, WESTMINSTER.

The first of the spring visits of the Architectural Association was made last Saturday to the new Church House, Dean's Yard, Westminster, when a party of nearly 100 members assembled. Sir Arthur Blomfield, the architect of the build-

ing, who was to have been present, had been summoned at the last moment to Sandringham, but very kindly sent some explanatory notes of the building, which Mr. Banister F. Fletcher, jun. Hon. Sec., who conducted the party, read to the members. The buildings are to be erected in sections; the part now being erected consists of the great hall, below which is a ground floor and basement; these will eventually be cut up into rooms to be let as offices, but at first by the omission of partition walls, &c., two large rooms are provided on the ground floor for the meetings of the Lower House and the House of Laymen in Convocation. These they will occupy until the western side of the quadrangle can be proceeded with, and in which their permanent accommodation will be provided. The great hall abuts on Great and Little Smith-streets, and is placed on the first floor. It is approached by two staircases of ample width and well lighted, leading from an entrance vestibule entered from Great Smith-street. This staircase block is kept down, and the western gable of the hall is seen overing above it from the street.

The hall has a total internal length of 124 ft., and a width of 50 ft. 6 in. between the walls, and being provided with a gallery all round will accommodate about 2,000 people. This gallery is 12 ft. above the floor, and projects 8 ft., by means of shaped iron cantilever girders, supported on a continuous rolled joist resting on iron stanchions placed at about 17 ft. 6 in. centres. These stanchions, of four angle-irons rivetted together, are taken up, and help to support the massive hammer-beams of the open-timbered roof, which is 62 ft. high to the ridge. This roof will be the main feature of the interior, and one bay had been specially finished, so that the members of the Architectural Association might have the opportunity of inspecting it in its finished state. The bays of the roof being wide, there are intermediate arched trusses, starting from the centre of the arches that connect the main trusses. A boarded soffit, about 8 ft. deep, concentric with these arches, runs back to the walls, spanning the large traceried window that occupies each bay. The extended stanchions referred to above are cased with oak Gothic banded shafts, carrying the connecting trusses just described. Cased iron is adopted, instead of solid timber, as might be expected, as the only way of avoiding the slightness, complaints, and even serious alarm caused by the shrinking and splitting of timbers, especially oak, of large scantling.

The main constructive timbers of the roof are of Slettin oak, the decorative tracery work being executed in English oak from the Peterborough district. The roof is boarded in narrow widths, with Williesdon paper, and covered with green Whitland Abbey slates. As a constructive novelty it may be mentioned that the roof gutters are entirely of concrete and sphatite instead of wood and lead, and Sir Arthur Blomfield mentioned in his interesting notes that he had adopted the same system elsewhere with success. The building is erected in a phase of Late Gothic which Sir Arthur has made peculiarly his own; the exterior is faced with red Ipswich bricks and Portland stone dressings, while in the interior Ancaster stone is used. A very hearty note of thanks was passed to Sir Arthur Blomfield for his courtesy in allowing the members to visit the building, and also to Mr. Edwin Russell, the foreman of Mr. John Thompson, of Peterborough, the contractor, who kindly answered the numerous questions put by the members.

THE LONDON COUNTY COUNCIL.
The usual weekly meeting of the London County Council was held on Tuesday, at the County Hall, Spring Gardens, Sir John Hutton, chairman, presiding.
Northern Approach to the Tower Bridge.—Mr. Alder brought up the report of the Improvements Committee, which contained a long paragraph in reference to the northern approach to the Tower Bridge. The committee had considered two schemes, and the one they favoured was for a street, 60 ft. wide throughout, from Tower-hill to Whitechapel High-street, by way of Mansell-street. They proposed to carry the new street on the western side of the Royal Mint (a portion of which might have to be acquired) in a direct line to Royal Mint-street at the point where Little Prescott-street entered that thoroughfare, thence passing in the line of Little Prescott-street to the junction of Mansell-street with Prescott-street, and from that point along Mansell-

street to Whitechapel High-street, directly opposite to Middlesex-street, which led into Sandy-slow, now being widened by the Council to 40 ft. The rounding of the corner of Great Alie-street at its junction with Mansell-street was also included in the scheme. The northern part of Mansell-street proposed to be widened was within the jurisdiction of the City Commissioners of Sewers, who had agreed to undertake that portion of the improvement provided the Council agreed to contribute (1) one-half of the cost of the work, and (2) one-third of the cost of an improvement proposed to be carried out by the Commissioners at Upper Thames-street. The estimate of the net cost of the proposed street was, for works, 74,000*l.*; for property, 276,000*l.*; giving a total of 350,000*l.*, which included the cost of a subway along the new thoroughfare. Deducting the estimated amount to be paid by the Commissioners, the estimated cost to the Council of the scheme would be 319,175*l.* In the opinion of the Committee that was the most pressing of all the improvements which they had as yet submitted to the Council, with perhaps the one exception of the southern approach to the bridge. They recommended that powers be sought in the first Session of 1896 to enable the Council to carry out the scheme; and that part of the cost of the proposed street be met by a charge upon owners of property benefited, in accordance with the principles laid down in Clause 36 of the Council's Tower Bridge Southern Approach Bill now before Parliament.

Colonel Ford moved—
"That in the opinion of the Council the improvement recommended by the Committee is not more needed than others in different parts of London, and therefore, in the absence of new sources of income, the Council is not at present prepared to bind itself to submit the scheme to Parliament in the year 1896."

Mr. Hubbard seconded the amendment, which on a division was carried by 46 votes against 37.

Proposed Widening of Upper Thames-street.—The Improvements Committee also recommended that the Council should contribute one-third of the net cost of the widening of Upper Thames-street, as proposed by the City Commissioners of Sewers, such contribution not to exceed the sum of 12,500*l.*

The Rev. Fleming Williams moved an amendment in similar terms to that proposed by Colonel Ford in the case of the proposed Tower Bridge improvement, but the amendment was negatived, and the recommendation of the Committee was adopted.

Micro-organisms of Sewage.—The Main Drainage Committee brought up the following report in reference to this subject:—

"In accordance with the authority given by the Council on January 23, 1894, the services of Mr. J. Parry Laws and Dr. Andrews were retained for the purpose of making investigations into the bacteriology of sewage, and their report of the result has now been laid before us. These investigations, the Council may remember, were undertaken in order to obtain corroborative evidence as to the conclusions arrived at in previous reports by Mr. Laws on the micro-organisms of sewer-air. In those reports it was shown that the bacteria of sewer air were related to and derived from those of the fresh air, and that there was no evidence that sewage was able directly to give up its organisms to sewer air. For greater convenience the present report is divided into two parts, the one dealing with the micro-organisms of sewage and their relation to those of sewer air, and the other containing observations on the bacillus of typhoid fever and its relation to sewage. These latter investigations confirm in a most striking manner the conclusions arrived at from the previous experiments on sewer air. If the organisms existing in sewer air were derived from those existing in sewage the bacteria of sewer air should bear a close resemblance to the bacteria of sewage. On contrasting the prevailing organisms of sewage with those of sewer air, they are found to bear no resemblance whatever to one another; indeed, so far as the authors are aware, not a single colony of any of the organisms found to predominate in sewage has so far been isolated from sewer air. Attention was also specially directed to the possible occurrence of the typhoid fever bacillus and the diphtheria bacillus in ordinary London sewage. Therefore, every colony which seemed likely to belong to either of these species was the subject of careful investigation. No evidence, however, of their occurrence in ordinary sewage was found. It is pointed out that the failure to find these organisms in ordinary sewage no doubt arises from the fact that the infected material constitutes such a minute proportion of the total bulk of sewage discharged by the sewers. The mathematical chances, therefore, of detecting these organisms are exceedingly minute unless

they are capable of vigorous growth and multiplication. Realising this fact, search was made for the typhoid bacillus in sewers where it might be expected to exist in much larger proportion. On examining sewage taken from the sewer draining the fever block at the Eastern Hospital, after disinfection had been discontinued for a short period, the existence of the typhoid bacillus was satisfactorily shown—an important fact which has not hitherto been demonstrated. A series of experiments were also made to determine the fate of the typhoid bacillus in sewage, in order to verify or disprove the statement made by many writers that disease germs, such as the typhoid bacillus, find in sewage a suitable soil for their growth and multiplication. On careful investigation it has been found that the bacillus of typhoid fever is not only incapable of any growth and multiplication in sewage, but that after the first twenty-four hours it slowly and surely dies out, its ultimate death under natural conditions being a matter of a few days, or at most one or two weeks. If the organisms which exist in overwhelming numbers in sewage do not exist in sewer air, how indefinitely remote is the possibility of the existence of the typhoid fever bacillus in the air of the sewers. Sewage is without doubt a common medium for the dissemination of typhoid fever; sewage-polluted soil may give up germs to the subsoil air; but from the results of these investigations it appears in the highest degree unlikely that the air of the sewers should play any part in the conveyance of typhoid fever."

Repairing and Painting Railings.—The Parks Committee reported that—

"The Council on July 24 last authorised the expenditure of a sum of 150*l.* for repairing and painting 1,752 yards of the railings at the Chelsea Embankment Gardens and Pimlico shrubberies. The specification and estimate were in due course forwarded to the Works Committee, but that Committee having reported that they were not satisfied with the sufficiency of the estimate, tenders were invited by advertisement, and the following were received—Charles Curd, 90*l.*; G. W. Stewart & Co., 120*l.* 18*s.*; L. Faulkner & Sons, 141*l.* 8*s.*; H. Ware, 145*l.* 7*s.* 6*d.*; Vigor & Co., 148*l.* 10*s.*; G. Searle, 152*l.*; A. Wallis, 150*l.*; J. Garrett & Son, 162*l.* 10*s.* 4*d.*; W. Dudley, 173*l.*; K. Harding & Son, 176*l.*; P. V. Windebank & Co., 179*l.*; F. W. Harris, 179*l.*; W. G. Dickson & Co., Lim., 180*l.* 15*s.*; H. Munn, 204*l.*; W. Marks, 207*l.* 10*s.*; J. J. Rayment & Son, 229*l.*; C. Rhodes, 236*l.*; C. Godbolt, 247*l.* 11*s.*; J. H. Cross, 249*l.* 10*s.*; G. G. Wade, 460*l.* Inquiries having been made, and the result being satisfactory, we recommend—

"That the Council do accept the tender of Mr. C. Curd to execute specified works of repair and painting to the railings of the Chelsea Embankment Gardens and Pimlico shrubberies for the sum of 90*l.*; and that the solicitor do prepare the necessary contract."

Mr. J. Burns, M.P., said he hoped that the work would not be given to Mr. Curd, as it was impossible for him to do the work properly and pay fair wages unless he lost a considerable sum by the contract. The architect's estimate was 150*l.*, so that it could not be done for 90*l.*

Alderman Taylor moved to refer the report back to the committee with instructions to do the work themselves.

The Hon. R. Grosvenor seconded, and the amendment was agreed to.

The Architect on Contractors' Work.—The same Committee reported as follows:—

"Some remarks having been made to the Council as to the manner in which the work of erecting the refreshment house at Parliament Hill has been done, we thought it well to direct the architect to report to us upon the subject. We now present that officer's report.—'The Committee is, in this case, asking me to report upon a building before its final completion, for there yet remain several weeks during which the contractor is liable to make good any defects that may be found in the building, and it is quite possible that in this case, as in all others, defects may arise which have not hitherto been discovered. I must ask the Committee, therefore, not to take this report as final and binding on me. The work in general is quite equal to that contemplated in framing the contract, and compares favourably with work that has been done in the Council's parks. There are, however, three places in which, during the autumn rains, wet got into the roof. I apprehend no difficulty in discovering the places where the wet came in and in putting the tiling and the turret right at these spots. There is a defect in the brick string round the building, and there is a place where a small piece of tiling ought to have been used, but where cement was used instead. The contractor has already got these matters in hand, but the weather for some weeks past has not been favourable. I have reason to believe this reference has been made at this particular time in consequence of certain statements which were made in the Council Chamber on November 23, 1894. I do not find the statements anywhere reported, but I believe they were to the following effect:—'That zinc had been improperly substituted for lead.—There is no foundation for this

statement. Zinc was substituted for lead by my direction, because I found that where lead had been recently used in such exposed places, thieves had got access by means of ladders and had stolen it. The zinc will last for a considerable number of years; and the difference between its cost and that of lead had been deducted from the contractor's account before this statement was made in the Council Chamber. 2. It was stated that there were seventeen broken hip-tiles upon the roof, but as a matter of fact there is not one broken hip-tile. I can only assume that the mistake has arisen from the necessity for cutting several of the hip-tiles in order to make them fit the slope and angle of the hips. Underneath those tiles which have been cut proper soakers have been put, so that no wet can get into the roof by this means. 3. Something was said about broken tiles upon the roof.—These tiles were broken by footballs, and the proper remedy will be to keep the football players at a somewhat greater distance from the refreshment house. 4. It was said that you could rub off the rough cisting, with the hand.—That can be done with the best rough casting, for a few pebbles are always rather loose when the work is freshly done.—THOS. BLASHILL."

After transacting other business, the Council adjourned.

ARCHITECTURAL SOCIETIES.

MANCHESTER SOCIETY OF ARCHITECTS.—“Combined Warming and Ventilating” was the subject of a lecture delivered by Mr. J. D. Sutcliffe before the Manchester Society of Architects on the 5th inst. The lecturer contended that the warming effect of an open fire upon a room is not obtained direct from the rays of heat, but from their reflection from the various material objects into which they come into contact, otherwise that the sole effect of the fire is to draw cold air into the room, especially along the floor. Much more warmth was derived by direct radiation from common stones, pipes and coils, but in all of these cases there was no ventilation, the same air being breathed and warmed over and over again. Indirect radiation he described as obtained by the passing of air over heated surfaces, and thence into the room, always securing some ventilation as well as warmth. This combined warming and ventilation when provision is made for supplying fresh air and simultaneously discharging vitiated air. He instanced the American system of Messrs. Smead. According to the lecturer, that system does not admit of proper provision for filtering the air where the conditions of the atmosphere render that necessary. The Plenum system, he said, is the best for large buildings, and is always associated with mechanical force, and admits of any filtering arrangements. A fan draws in external air through a filter, and at the same time propels it through heating apparatus, whence the filtered and warmed air is driven into main and branch ducts that terminate in the rooms to be warmed. Entering above the heads of the occupants, the warm air necessarily rises at once to the ceiling, where it spreads, cools, and consequently descends, eventually passing out at the floor level by exit ducts there provided. Dusty and other vitiated air is thus prevented from rising, and the weight of the respired carbonic acid gas accompanies and aids the descent. Experience proves that the warmth so derived is agreeable and equable, and the system prevents inward draughts or the entry of any contaminated atmosphere from outside, such entry being often experienced where mechanical force is applied solely for drawing foul air out. The system provides for entirely renewing the air of the room at any desired rate up to ten times an hour. It has been theoretically inferred that air, when treated as described, must be unhealthily dry, but repeated tests prove the presence of ample moisture. A hearty vote of thanks was passed to Mr. Sutcliffe for his lecture.

ARCHITECTURAL SECTION OF THE GLASGOW PHILOSOPHICAL SOCIETY.—A meeting of the Architectural Section of the Glasgow Philosophical Society was held on the 4th inst. Mr. Paton, Curator of the Corporation Galleries, delivered an address on “Mosaics.” At the conclusion of the lecture a vote of thanks was awarded to Mr. Paton, on the motion of Mr. T. L. Watson, President of the Section, who presided.

GLASGOW ARCHITECTURAL ASSOCIATION.—At the general monthly meeting held in the Rooms, 114, West Campbell-street, on Tuesday evening, the Vice-President, Mr. Wm. Tait Conner, in the chair, Mr. R. N. Horn read a paper on “The Development of School Planning.” The author traced the development of the school plan from the earliest type, which consisted usually of one large room in

which both sexes were taught together by one master. At that time the education was of the most superficial kind, and no attention was paid to the health and comfort of the children. The different kinds of school built after the passing of the Education Act, culminating in the modern Board school, were described at some length. The second part of the essay was devoted to a description of the various requirements of a present-day school—the principal feature of which was the large central hall. The arrangement of the various class-rooms was considered in detail. The important question of heating and ventilation was finally discussed, and the advantages and disadvantages of ventilation by the extraction and plenum systems were explained. The lecturer was inclined to favour ventilation by extraction, and described the scheme of ventilation adopted at one of the schools built by the Govan School Board.

NORTHERN ARCHITECTURAL ASSOCIATION.—The Students' Sketching Club in connexion with this Association held their fifth annual School Gathering in the Grand Assembly Rooms, Newcastle-on-Tyne on Tuesday last. Upwards of 100 members and friends assembled to view the students' work executed during the past season.

PLYMOUTH SCHOOL OF ART.—Mr. B. Priestley Shires, A.R.I.B.A., in continuation of the series of lectures on “Architectural History,” before the junior members of the architectural profession of the Three Towns, at the Plymouth School of Art, Princess-square, delivered the eleventh lecture on the 31st ult. Mr. Shires, in his opening remarks, mentioned the causes which led to the development of the Romanesque styles in the tenth century, and said in the eleventh century each country struck out a style of its own, Germany retaining more of the older characteristics than either France or England. As long as the unbroken horizontal lines continued in use, so long may English-Norman work or the Anglo-Romanesque style of architecture be classed as purely Romanesque; but when vertical shafts were introduced running up in front of the piers in ecclesiastical buildings, and dividing the triforium and clerestory into compartments, then the first principle of Gothic architecture began to manifest itself, and, coupled with the use of the pointed arch, many new features were developed. Without going into any of the many theories as to the origin of the pointed arch, Mr. Shires thought it was by far the best plan to consider the pointed arch in the same light as nearly all other architectural features as a development. The Gothic period practically began with the thirteenth century and closed with the fifteenth century, as far as good Gothic architecture is concerned. The term Gothic was first used more as a term of reproach than for any other reason, and intended to distinguish those buildings which were considered barbarous in style, that is, those which were not Classic. During those centuries it prevailed more or less throughout the western, middle, and southern parts of Europe, and though there are some variations in the buildings of the different nations who adopted it, still as a whole they are practically one style.

ENGINEERING SOCIETIES.

SOCIETY OF ENGINEERS.—The first ordinary meeting of the Society of Engineers for the present year was held on the 4th inst. at the Westminster Palace Hotel, Westminster. Mr. George A. Goodwin, the President for 1894, occupied the chair, and presented the premiums awarded for papers read during that year, viz.:—The President's Gold Medal to Mr. T. W. Baker, for his paper on the “Utilisation of Town Refuse for Generating Steam.” The “Bessemer Premium” to Mr. Ed. C. de Segundo, for his paper on “Power Distribution by Electricity, Water, and Gas.” The “Rawlinson Premium” to Mr. R. Nelson Boyd, for his paper on “A Deep Boring near Friedland, Austria, by the Canadian System,” and a “Society's Premium” to Mr. H. B. Ransom, for his paper on “The Principles and Practice of Hydro-Extraction.” Mr. Goodwin introduced the President for the present year, Mr. Wm. George Peirce, to the meeting, and retired from the chair, receiving a hearty and unanimous vote of thanks for his services during the past year. After some preliminary remarks, the President gave some particulars of the Blackwall tunnel now in course of construction. This important public work is being constructed by a combination of methods which unite the use of the shield, cast-iron segments, and compressed air. It will consist of 3,083 ft. of cast-iron lining; 1,382 ft. of cut-and-cover in brickwork and concrete, and 1,735 ft. of open approaches, giving a

total length of 6,200 ft. from entrance to entrance. Up to January 2 last, 722 ft. 6 in. of tunnel under the river had been completed. The President then went on to deal with the question of water supply. Referring to the water famine at Leicester, he observed that the water storage there was too limited for the growing requirements of the town, and an additional storage reservoir was in course of construction. As a matter of fact, water engineers generally look to meeting future requirements, so as to avoid possible water famines in our great all-giving towns. That was now being done in the Metropolis, where the daily water consumption in 1891 was 182,456,000 gallons. According to the report of the Royal Commission which had just completed its labours, the estimated daily consumption in 1931 would be 294,000,000 gallons. To meet the growing requirements, the metropolitan water companies are constantly increasing the sources of supply. Those taking the bulk of the water from the Thames and Lea are opening up the gravel beds overlying the London clay. Others have been sinking wells and driving adits in the chalk, and the President stated that the various operations were, as a rule, giving satisfactory results, so that as far as the Metropolis is concerned, there would appear to be no fear of a water famine, at any rate for some time to come. The President concluded his address by a reference to technical education, which he said was of no practical value to the young engineer unless it was combined with knowledge gained in the daily round of the factory and workshops, should be shouldered with workmen.

THE INSTITUTION OF JUNIOR ENGINEERS.—On the 2nd inst. a party of the members of the Institution were enabled, by the courtesy of Messrs. Maudslays, Sons & Field, to visit the company's marine engineering works at Lambeth. They were conducted through all the various shops of the extensive establishment. At the conclusion of the inspection, Mr. W. J. Tennant, past-chairman of the Institution, expressed their members' acknowledgments for the preparation which had been made for their reception.

INSTITUTION OF CIVIL ENGINEERS.—At the ordinary meeting of this Institution, on the 5th inst., Sir Douglas Fox, Vice-President, in the chair, the paper read was on “The Mechanics and Electrical Regulation of Steam-Engines,” by Mr. John Richardson, M.Inst.C.E., Lincoln.

SURVEYORSHIPS.

SHOREDITCH, LONDON.—Mr. T. Ridyar Roscoe has been appointed Surveyor and Engineer to the Vestry of the Parish of St. Leonard, Shoreditch, London, E.C., at a commencing salary of 300l. per annum. He obtained eighty-one votes as compared with nine votes given by his nearest competitor.

ECCELESIASTICAL SURVEYORSHIP.—Mr. Arthur Blomfield Jackson, A.R.I.B.A., has been appointed a Surveyor under the Ecclesiastical Dilapidations Act to the Diocese of St. Albans.

FINEDON.—We learn that Mr. Abraham Mosley, of Northampton, has been appointed Surveyor to the Finedon Urban District Council.

Correspondence.

To the Editor of THE BUILDER.

DURHAM CATHEDRAL.

SIR,—In my letter of last week, please correct a error as to where my lecture is to be found. It is in 7/2 of the paper.

Mr. C. Hodgson Fowler, architect, of Durham, who is conducting the excavations at the east end, gives me some information which may be interesting.

The dressed ashlar which Canon Greenwell carried upon after Mr. Fowler had commenced the excavations, appears to be nothing but a portion of the Early English wall, and therefore of the date of the Chapel of the Nine Altars.

Several mistakes occur in the otherwise excellent article which appeared in the *Times* a few days ago. One, that the apse walls were “12 ft.” thick. Another, as to depth. A wall has been reached 11 ft. from the level of the present floor of the Nine Altars Chapel, and not “20 ft.” as there stated.

Mr. Fowler will probably read what cannot be to be a very interesting paper on the subject of the eastern termination of Durham Cathedral, before the Society of Antiquaries, so soon as his researches enable him to provide an ascertained plan.

E. R. ROBSON.

DISTRICT COUNCILS AND NEW BUILDINGS.

SIR,—“A Town Surveyor,” whose letter is published in your issue of the 2nd inst., does not appear to have seen the correspondence in the *Times* to which the correspondence in your columns has been supplemental.

It is common ground between Mr. Jackson and myself that the addition which has given rise to the discussion is an addition to a building erected long before the existence of by-laws. This being so, I am glad to see that “A Town Surveyor” agrees with me on the main point at issue, since he says, “If perchance the main building was erected prior to the adoption of the building by-laws the regulations as to the reservation of the open space will not apply,” and he proceeds to quote a case which I had already quoted in the *Times*.

Unfortunately, “A Town Surveyor,” in the earlier part of his letter, has jumped to the conclusion that the main building was erected under the by-laws, and on this mistaken assumption he charges the District Council with “remarkable eccentricity.” Even if he has not seen the former correspondence, he has seen (for he quotes) a passage in Mr. Jackson’s last letter, referring to the main building as an “old” building—an expression which surely ought to have enlightened him. But “A Town Surveyor” is evidently a cynic, predisposed to assume perversity in Local Authorities.

As regards the Wimbledon by-laws, they are based upon the Model By-laws of the Local Government Board, and contain the clause mentioned by “A Town Surveyor,” prohibiting any future encroachment upon the space which they require to be left about new buildings. This clause Mr. Jackson in one of his letters strangely overlooked.

I agree with “A Town Surveyor” and Mr. Jackson in thinking it desirable that District Councils should have control over additions to old buildings, but the present state of the law is not due to a mere blunder or oversight. It should be borne in mind that in rural districts there is at present no control over buildings at all, except where urban owners have been conferred by order of the Local Government Board. We thus have (a) rural districts where there is no control over buildings; (b) urban districts where there is control over new buildings; (c) London and some other large towns where there is control over new buildings and also over additions to old buildings. So that the law is not without a certain symmetry, and the principle is intelligible, if not satisfactory, to what, for want of a better word, I may call “progressive” ideas.

I do not follow the remarks that have been made to the Council receiving and approving of plans for additions to old buildings. I think the practice useful, and is not open to any substantial objection so long as the Council does not exercise any unjustifiable pressure. But whether right or wrong, cannot affect the law on the subject, which is all that I care to discuss.

Mr. Jackson is incorrect in supposing that any rate is payable on the approval of plans by the Council.

I would revert for a moment to Mr. Jackson’s original contention that every substantial addition—any rate every addition covering new ground—is a new building. The word “building” has two meanings. First, “the act of constructing,” and second, “the edifice constructed.” (*vide* “Imperial Dictionary.”) It will hardly be contested that the by-laws use the word in the latter sense only, though fancy some confusion has arisen on account of the two meanings. In order to clear away this confusion let us take a word that has not this double meaning. Take the word “church.” If an addition to an old church is constructed, in the shape of a porch or an aisle, would Mr. Jackson say that the addition was a new church? I think not.

Lastly, I submit that residents in a locality are not so much at the mercy of the Local Authority as Mr. Jackson and some others seem to suppose. By-laws, when validly made, are just as much part of the law of the locality as if they were in an Act of Parliament. They are penal in their nature, and, therefore, technically form part of the criminal law. As a rule, anyone can put the criminal law into action, and I know of no reason why a private individual should not take out a summons against a builder under the by-laws if he is dissatisfied with the inaction of the Local Authority.

“THE CLERK TO THE DISTRICT COUNCIL OF WIMBLEDON.”

February 4 1895

LONDON BUILDING ACT, 1894: BEDFORD COURT MANSIONS CASE.

SIR,—As I was present at the hearing of this case in Bow-street, I hope I may be allowed space to make a few remarks. Your report is to a certain extent misleading.

It is the second point of contention to which I specially refer—viz., whether the building in question as a building “to be carried out under any contract entered into before the passing of the Act” (*i.e.*, August 25, 1894. Mr. Freeman argued that a “building agreement” was not a contract intended by Sec. 212, but that only a contract between the building owner and the builder

to erect a building was intended. Mr. Ivory did not contend that in all cases a building agreement was a contract within the meaning of the section—indeed, he admitted that a building agreement to erect a certain number of houses of a certain class on an estate would not come within the exemption; but he contended that in this case he had made out a definite contract to erect a particular building. The building agreement was entered into in 1890, and the plans were actually approved shortly afterwards, years before the passing of the Act (this fact, although important, is omitted from your report), and the magistrate’s decision was that in this case such a contract had been made out.

The result of this decision is, that in order for a building owner to be allowed to erect a building under the old Acts, he must show a definite contract to carry out a particular building; a mere building agreement will not of itself be sufficient; and, in order to make it so, the building owner must show that it became a definite contract before the passing of the Act by the approval of the plans by the lessor, or that the building was in some other way particularly described.

BERNARD DICKSEE.

THE LEGAL POSITION OF ARCHITECTS IN RELATION TO CERTIFICATES AND AWARDS.

SIR,—I have read with great interest this paper and discussion of last Monday’s meeting at the Royal Institute of British Architects, but without finding definite answers to certain questions upon which I am at present peculiarly in want of authoritative information, and I shall be much obliged if you or any of your readers will kindly let me know as follows:

1. Whether Clause No. 8 in the heads of conditions of builders’ contracts sanctioned by the Royal Institute of British Architects is one usually retained?

2. If retained, whether and in what way it is binding upon the employer?

3. Why there is no reference to “materials brought and left upon the ground” in Clause No. 17 (the payment clause)? and

4. Whether (and this is the important point) when an architect gives certificates under “Conditions of Contract” embracing both Clauses Nos. 8 and 17, it is his duty to make fair valuation of the “works executed and materials supplied,” or to satisfy his employer by certifying amounts for “works executed” only (under Clause No. 17)?

“A YOUNG PRACTITIONER.”

The Student’s Column.

BRICKS AND TERRA-COTTA.—VI.

COMPOSITION OF BRICK-EARTHS (*continued*).

WE are now in a position to more carefully examine the grosser particles, from a mineralogical point of view, under the microscope. If the clay has been derived directly from granitic rocks we shall find that these particles principally consist of grains of quartz, and in some cases of perfect crystals of that mineral also. In addition, there will be a fair proportion of fragments of felspar, and a little iron and mica. Quartz is not a difficult mineral to determine: it is usually of a glassy appearance, quite transparent, whilst its crystalline form is that of a hexagonal prism surmounted by hexagonal pyramids. In thin sections under the microscope it polarises in beautifully clear and brilliant colours. The fragments of felspar, when highly decomposed, as they frequently are in clays, are not so easily determinable. As a rule they are much kaolinised and quite dusky and opaque in thin sections. Their precise nature, however, may sometimes be ascertained in such pieces as present an undecomposed nucleus. The mica is determined with facility; in hand specimens it is seen as bright glittering plates, mostly black or silvery brown, whilst under the microscope it is strongly dichroic, having regular systems of parallel lines (except when accidentally cut along the planes of cleavage), and frayed-out at the edges.

When the clay we are examining is not derived directly from the disintegration of granitic rocks a variety of other minerals put in an appearance, and the precise kinds and quantities of these must depend entirely on local circumstances. We may, however, briefly allude to some of the more salient of them, especially as they are more or less present in all clays used for brickmaking, and materially influence the effect of firing.

Rutile occurs in very many brick-earths. It is generally invisible until the microscope is used, when it appears as hard chocolate-coloured or black specks. In thin sections it is mostly granular in form, or sub-angularly prismatic whilst it is slightly dichroic and is often deep-red in tint.

Zircon is not so common in brick-earths; it exists as rather hard grains, or little prismatic, crystals, often abraded. It has an extremely high refractive index, which causes the particles mounted on our slides to stand out clearly from amongst those of other minerals, and to have dark borders. In thin sections the surface is very much pitted. Like rutile, it is infusible under the blast of the blowpipe.

Hornblende and *Augite* occur locally; for a brief description of these, the student is referred to our former observations.

Schorl, the black variety of *tourmaline*, is frequently found in brick-earths in the vicinity of granitic rocks. It may be in small, sub-angular, crystalline grains, or as a deep brown decomposition product; in thin sections it is occasionally seen as acicular radial aggregates, though not so characteristically as when it has formed in or interpenetrates quartz, or other similar minerals.

Glauconite is a green mineral, or rather a general name for greenish mineral substances of variable composition, but mostly silicates. It occurs in the interior of the tests of minute forms of life in certain seas, and from its appearance in some sands it seems tolerably clear that much glauconite, if not all of it, owes its origin to the same causes as that in process of formation at the present day. In clays and brick-earths we rarely find it as casts of these tests, as it has suffered much attrition and is chiefly reduced to mere sand-grains, all traces of its former outline having been removed.

Selenite, a form of gypsum, is sufficiently abundant in many clays to materially affect their ultimate composition when prepared as brick-earths. It commonly occurs as large and beautifully symmetrical crystals, which are known by labourers in brickyards as “lozenges.” Typically it is white and quite transparent. Smaller fragments under the microscope may be recognised by their peculiar sheen and rather bright polarisation colours.

Iron exists in practically all clays and brick-earths, in one form or another. At surface exposures it imparts the brown appearance to them, whilst at greater depths, or in clays that have not been much affected by the weather, it is chiefly of a dark blue tint. *Magnetite* is often present as minute grains, which may be withdrawn from the clay sample when powdered ready for examination, by inserting a bar magnet. Other oxides of iron, such as limonite and hematite, occur sometimes as small particles, but the former chiefly as staining the kaolin constituent and covering other grains of mineral matter with a thin film. The presence of iron, and the state of the mineral in earths, are such important factors in considering the quality of fire-clays and the like, that these points must be rigorously investigated. Owing to the circumstance that nearly all forms of iron are opaque in thin sections, and that they do not present characters sufficiently distinct to enable us to determine them in reflected light (when existing in such minute and weather-beaten particles), we must have recourse to chemistry to assist us in this particular instance.

Iron pyrites exist in both large and small pieces in very many brick-earths. When large enough to be examined with the naked eye, the fragments are generally black or dark brown exteriorly, and exhibit an ornate radial structure of a brassy lustre interiorly. *Marcasite*, a similar mineral, is not uncommon.

The above list exhausts practically all the common minerals found in ordinary brick-earths; but, in addition to these, organic fragments and concretions are sometimes so abundant as to affect the composition of the whole. Dealing first with concretions, we may say that they fall into two categories, according as they are septaria, or phosphatic nodules. The latter do not concern us much, as they are generally large enough to be treated as pebbles, and are discarded in the preparation of earths for good bricks. The former are even larger, but may frequently be broken up and incorporated with the brick-earths in process of manufacture, especially where these latter are almost devoid of lime, though this is not often done. Iron pyrites is in a certain sense concretionary. Of the organic remains we slightly alluded to them in the last article; they consist either of the fragments or whole tests of fossils, easily recognisable as such under the microscope, or pieces of fossil wood, and in some cases of the bones of animals. As a matter of interest to the London student we may say that the bones of extinct elephants, rhinoceroses, oxen, musk-sheep, and many other large mammals, presenting a peculiar admixture of arctic with

* The Builder, March 17, 1894, p. 220.

tropical forms of life (if regarded in the light of the geographical distribution of their modern representatives), all of which lived in the Thames valley at a remote period, may very frequently be met with in the brick-earths of Grays, South Essex, Erith, Crayford, &c. Remains of the same animals are found also in the brick-earths of many other river valleys in England.

We come now to consider briefly the nature of the pebbles so common in nearly all valley brick-earths and in certain other superficial deposits used in brickmaking. These for the most part are hard stones which are removed in preparing the clays for all but the worst quality of bricks. It might be thought, therefore, that they were barely worthy of mention, but such is not the case. If all of them were hard and insoluble, and thus easily removed without affecting the character of the other ingredients of the earths, there would be little difficulty. But in many districts, especially in the boulder clays of the Eastern Counties, in addition to pebbles of flint, quartz, &c., there are frequently present considerable proportions of chalk pebbles which are more or less rotten now, and are easily broken up in the levigating process to the size of peas and small shot, whilst they are soluble in acidulated waters such as are commonly used in preparing the earths. We shall see later on that although a small proportion of lime does not matter (except for specific purposes)—is indeed a desirable constituent of brick-earths—that an excess of this entirely spoils the bricks. When the carbonate of lime exists as small soft pellets which become incorporated with the earths, it ruins the material for brickmaking, as during the burning the pellets become calcined and “blow off.” If the pellets are impregnated with iron they simulate the remaining ingredients in appearance, and are then specially deceptive.

Chemical Composition of Minerals found in Brick-earths.

By way of introduction to the chemical constitution of the various earths employed in brick-making, we may closely examine that of the minerals of which these earths are made, otherwise the chemical properties of the whole may not be properly understood. The following table and its supplementary remarks describe the chemical composition of all the minerals concerned, and which were alluded to either in the last article, or in this—

	Silica.	Alumina.	Potash.	Soda.	Lime.	Magnesia.	Iron.	Sulphur.	Zinc.	Boric Acid.	Water.
Quartz	100	—	—	—	—	—	—	—	—	—	—
Orthoclase	64.1	18.5	1.0	—	—	—	—	—	—	—	—
Oligoclase	44.7	0	1.7	5.1	—	—	—	—	—	—	—
Anorthite	43.1	0	—	—	—	—	—	—	—	—	—
Labradorite	45.1	8.4	—	—	—	—	—	—	—	—	—
Kaolin	46.3	39.8	—	—	—	—	—	—	—	—	—
Mica*	50.0	36.0	—	—	—	—	—	—	—	—	—
Zeolite	—	—	—	—	—	—	—	—	—	—	—
Hornblende	45.1	13.1	—	—	13.0	15.0	14.4	—	—	—	—
Selenite	—	—	—	—	—	—	—	—	—	—	—
Pyrite	—	—	—	—	—	—	—	—	—	—	—
Iron Pyrite	—	—	—	—	—	—	—	—	—	—	—

* Orthoclase usually has small, variable proportions of lime, iron, magnesia, and soda.

† This is the chemical composition of pure white clay, and is inserted here for comparison with other minerals to show the chemical nature of impurities in clay.

‡ This refers to muscovite mica, which generally has a small percentage also of fluorine; biotite is characterised by the occurrence of from 15 to 30 per cent. of magnesia.

§ Hornblende is very variable in chemical composition. The average analysis here given refers to the dark-green

Iron.—Magnetite—ferroso-ferric oxide, iron 72.41, oxygen 27.59; limonite—hydrous ferric oxide, iron oxide 85.56, water 14.44, and hematite—anhydrous sesquioxide of iron, iron 70.0, oxygen 30.0.

Rutile=oxide of titanium; or, titanium 60.98, oxygen 39.02.

Augite is extremely variable in composition. The aluminous variety has from 47 to 56 per cent. of silica, 4 to 9 per cent. of alumina, and a little ferrous oxide; the non-aluminous consists of meta-silicates of magnesium and calcium, frequently with some proto-silicate of iron and manganese.

Selenite is the crystalline form of gypsum—hydrous sulphate of lime, sulphuric acid 46.51, lime 32.54, water 20.95.

Calcite and Aragonite have the same chemical composition—calcium carbonate, carbon dioxide 44.0, lime 56.0.

“MAGAZINES AND REVIEWS.”—Owing to pressure on our space, we are obliged to hold over our usual notice of the contents of current magazines.

GENERAL BUILDING NEWS.

CHURCH SCHOOL, PENZANCE.—The foundation-stone of a day school for St. John's, Kedinick, Penzance, was laid recently by Mr. T. R. Bolitho. The school will occupy a piece of ground near St. John's Church, and accommodate 200 children—120 boys, 86 girls, and 20 infants. Each department will be distinct, with separate playground, entrance, and necessary offices. Mr. Henry White is the architect. The contracts have been entrusted to Mr. T. James, carpenter, and Mr. E. Fidwell, mason; Mr. J. Ball, of Truro, being clerk of the works.

NURSES' HOME, SOUTH-EASTERN HOSPITAL.—In giving some particulars of this week or two back (page 70 *ante*) we gave Mr. J. S. Quilter's name as the architect. He writes to ask us to correct this, and to state that it should have been Messrs. Quilter & Wheelhouse.

CATHOLIC CHURCH, WEST HARTLEPOOL.—On the 31st inst. the new Catholic Church was opened at West Hartlepool. The building has been dedicated to St. Joseph. The new church, the estimated cost of which is 13,000*l.*, is now practically completed. With the exception of the tower, of which only the foundations are laid, the whole design of the church has been carried out. The church, which has been built from the plans and under the superintendence of Messrs. Dunn, Hansom, & Fenwick, architects, of Newcastle-on-Tyne, is a structure of an early type of English Gothic architecture. It is a brick building, faced externally with red Gosmoor bricks, and having dressings of red sandstone, the roofs being covered with green Westmorland slates. The window tracery is worked in Combe Down stone. Bath stone is also used in the interior for the arcade, &c. The church consists of a nave and aisles, a chancel, terminating in semi-decagonal apse; north chapel, a south transept containing a chapel, with organ-gallery above, and will have a tower at the north-west corner. The nave and chancel are 26 ft. wide, with a combined length of 130 ft. The width across nave and aisles is 60 ft., and the latter are 85 ft. long. The chapel, at the ends, is 26 ft. long by 13 ft. in width. There are two large sacristies adjoining the south transept for the clergy and choir, and a staircase leading to the organ-chamber, the heating vault being below. There is a row of confessionals opening from the south aisle, but entered by the clergy from a corridor at the back, connected with the sacristies. These and the church are warmed by hot-water apparatus. The nave is covered with a hammer-beam roof of pitch-pine, partially ceiled (above its main arch) at a height of 51 ft., and the whole lined with boarding, being divided into panels by mouldings. Immediately above the

pool; gas-fitting, &c., Messrs. Singer & Son, Frome.

BOARD SCHOOLS, WALSEND.—On the 4th inst. the new senior Board Schools recently erected at Carville, Walsend, were opened by Mr. Geo. J. Hunter. The new schools are erected on the central hall arrangement, from designs by Mr. W. H. Hope of Newcastle and Shields, the main apartment being 61 ft. long by 22 ft. wide, flanked by 5 class-rooms—three on each side—each capable of seating sixty senior scholars.

WOODSIDE NEW WESLEYAN CHURCH, HORSFORTH, YORKSHIRE.—A Wesleyan Church has recently been erected at Horsforth under the supervision of Messrs. Fairbank & Wall, architects, Bradford, at a cost of 2,250*l.* The various works have been carried out by the following contractors:—Mr. Thomas Lawrence, Horsforth, mason; Messrs. B. Child & Son, Horsforth, joiners; Mr. T. Brearcliffe, Horsforth, plumber; Messrs. R. Dixon & Co., Bradford, plasterers; Messrs. H. & Nelson, Bradford, slaters; and Mr. Simpson Cockcroft, Alton, painter.

ALEXANDRA PARADE U.P. CHURCH, GLASGOW.—This new church, which is situated in Alexandra Parade, at the corner of Firpark-street, is built of Ballochmyle red freestone, and has been designed by Mr. J. G. Macdonald, Glasgow, in a simple English style. The principal front is to Firpark-street. The entrance doorway has an arched top supported on either side by Aberdeen polished granite columns, with moulded freestone capitals and bases. Above the main entrance is a three-light window filled with tracery. The windows are of the same design, and are placed in the full height of the gable, and are finished with moulded splayed cornices and surmounted by stone finials. The accommodation provided in the area and gallery of the church extends to nearly 700 seats. Behind the church and fronting the Parade is a session-house, vestry, and church officer's house. Over the entrance is a large hall, which is capable of seating 330 persons. The roof of the interior is of wood, and the pews are finished in pitch-pine. The pulpit and all the doors are finished in yellow-pine, stained and varnished. The contractors were:—Mason work, Alex. Eadie & Son, joiner work, Chas. Gray & Son, plumber work, Ingelton & Co., slater work, J. McQuat & Son, plaster work, Wm. Tonner, heating, Jas. Cornall & Sons; painter work, Thos. Lawrie & Co.; gates and railings, M'Callum & Hope.

SANITARY AND ENGINEERING NEWS.

THE EDINBURGH WATER SCHEME.—A special meeting of the Edinburgh Town Council was held in the Council Chambers recently, for the purpose of considering (1) report by the Lord Provost's Committee on a letter from the clerk to the Edinburgh and District Water Trust recommending approval of the Tall scheme for an additional water supply for the city and district; (2) draught of a proposed Bill being promoted by the trustees; and (3) Parliamentary notice of proposed alteration and repeal of statutory provisions by the Bill. The Lord Provost formally moved the approval of the report, and that no action be taken with reference to the Parliamentary notice. Mr. Colston seconded. He pointed out that the statutory authority on the question had satisfied themselves that an additional supply was necessary. There was no need of alarm that the burden upon the ratepayers would be heavier than they could bear. In the year 1872 the amount realised for water sold through meters at 9d. per 1,000 gallons was only 5 66*5*/. In 1883 this had increased to 22,10*5*/. while in 1893-4 the rate being reduced to 6d. per 1,000, it realised 25,733*4*/. The result had been that the domestic rate had been reduced from 9d to 5*5*d per 1,000 gallons. Treasurer Macrae moved an amendment that the Council recommend the Trustees not to proceed with a new water scheme in the ensuing Session of Parliament, so that an opportunity be afforded for fully considering the relative merits of the two schemes reported on by the Trust's engineer on September 25, 1894. The Tall scheme worked out at 83,120*l.* per one million gallons, as compared with 54,000*l.* for the St. Mary's Loch scheme, being a difference of 29,000*l.* per one million gallons. The present supply of 75 million gallons should last twelve years, and they should pause before they entered upon an additional expenditure of three quarters of a million. Bailie Macpherson seconded the amendment. The Lord Provost's motion was adopted by 20 votes to 15 given in favour of the amendment, two members declining to vote.

FILTER PRESS MACHINERY FOR SEWAGE DISPOSAL WORKS.—A meeting of the Royal Society of Arts was held in the hall, 117, George-street, on the 28th ult., Dr. William Taylor, President, in the chair. Mr. William Fairley, engineer, Richmond Main Drainage Board, read a paper on “Filter Press Machinery for Sewage Disposal Works.” Mr. Fairley dealt with the most recent practice of disposal, in destructors, by steam barges as carried out by the London County Council, and filter presses. A description was given of a large plant put down by him, embodying many improv-

ments, and combining the advantages of both the air pressure and the direct pumping systems. He also gave particulars of a system applicable to works for small towns, where not only the sludge pressing but all operations requiring mechanical power were carried out by compressed air, generated by a small oil-engine, with considerable saving on the first capital outlay and annual maintenance. In the discussion which followed the subject of purifying sewage by electricity was mentioned, and Mr. Fairley stated that he would be able to bring forward a system by which the process of electrical treatment would be very much cheapened. At present, where electric lighting had been put down, the great cost was caused by the unequal load during the twenty-four hours, and his suggestion was to treat the whole of the sewage by electricity, and use the filtering medium for the purpose of assisting in generating steam. Under that system the sewage purification and the lighting of the public streets would be done by the same engine and plant and by the same annual labour, thereby reducing the cost.

SEWAGE WORKS, UPPERMILL.—The first sod of the sewage outfall works for this district was cut on the 31st ult., by the Chairman of the late Local Board, Mr. J. Taylor Bradbury. The International Sewage Purification Company precipitation process, by ferrocene, and filtration through polarite, is the system which the Messrs. Pearson in the circular plan, with the improved arrangements for sludge removal. The contract has been let to Messrs. H. Cotherby & Son, Burnley, who will proceed with the work forthwith.

SANITARY ENGINEERING APPOINTMENT.—Mr. V. Kave Parry, M.A., has been appointed by the Board of Trinity College University, examiner in practical sanitary engineering for the qualification of State medicine in the University of Dublin.

MISCELLANEOUS.

VENTILATORS FOR MANHOLES, CELLARS, &c.—Under the title the "Simplex Ventilator System," Messrs. Pearson & Co. (London) propose a cast-iron inlet tube, to be laid below foot pavements, with an inlet in the edge of the kerb, for the purpose of admitting to manholes, underground cellars, &c. the point of the proposal is derived from the recent Board of Trade enquiry into the explosion in the city which shows, say Messrs. Pearson in the circular illustrating their method, "that the laying of electricity supply cables throughout the streets in close proximity to gas supply mains and sewer conduits has made it an imperative necessity to have a thorough system of ventilation applied to the manholes and places of similar construction in connexion with any such subterranean works, to avoid the accumulation of gas in the manholes, &c." That the ventilation of places where gas may accumulate from leakage, or the provision for dispersing the gas, may become an important consideration where electric mains are laid in antiquity with gas-mains, we have recently had too good reason to recognise, and the method proposed by Messrs. Pearson is a well-meant attempt to this end, though it can hardly be called a system. We see that it is "provisionally protected," and that we hardly see how there can be any patent rights of use of an iron pipe to admit air; the particular position in which it is proposed to lay the pipe is its special feature about it.

SURVEYORS' INSTITUTION.—Of the candidates who presented themselves at the preliminary examination of the Surveyors' Institution, held concurrently in London and Manchester on the 23rd and 24th ult., the following satisfied the examiners:—J. H. Addie, Welsphol; S. W. Ambler, Woburn; B. B. Addeley, Stamford Hill; J. Banks, Manchester; J. B. Baverstock, Godalming; E. C. Bedwell, Kentwood; M. C. Blunt, London; G. Bowden, Easthoughton; H. Bowden, Newport, Barnstable; J. N. Brackett, Orsett, Essex; F. H. Burrows, Ashford; T. A. M. Castle, London; C. Chart, Litcham; C. W. Clarke, Leeds; W. Clarkson, London; H. Collins, High Wycombe; G. F. Cox, Aldridge; C. Crowther, Haugh, Bolton; H. J. H. Daniel, near Salford, Somerset; T. F. Dungham, Colchester; F. B. Evans, Maidstone; R. Field, Anerley, S.E.; E. C. Fieldier, Milborne, Malmesbury; A. L. Finch, Reading; P. A. Fowler, Wycombe; N. M. Foulkes, Tring, Herts.; E. Gayer, Bristol; D. F. Goldsmith, Blendworth, Horndean, Hants; H. G. Gomm, Brentford; C. S. Goodchild, Halstead, Essex; H. Goodbhere, Longsight, Manchester; G. E. H. Ham, London; H. N. Gray, Forest Gate, E.; E. Gripper, Chichester; J. F. Hawkins, Bromley; H. Heal, London; L. Hood, Jun., Duns, B.; R. E. Jackson, Gower, Carnarvon, Lancs.; B. Joseph, Stratford, E.; L. E. Jones, London; C. Key, London; N. P. Laird, Kirby Muxloe, Leicestershire; C. F. D. Lang, London; C. A. Adge, St. Albans; W. M. Marcus, London; J. M. Ward, London; H. A. Newman, Parkstone, Dorset; W. Paice, Woolacombe, N. Devon; T. W. Pender, Modbury, Devon; F. A. Pold (passed at head of list), Rugby; F. R. Pipp, Tewkesbury; J. R. Pinger, Newbury, Berks; S. Protheroe, Leytonstone, Essex; W. H. Telford, Accrington; D. W. Reeve, Sutton; R. Robinson, London; H. Sheldon, Middlewich; C. O. Sheppard, Neath, South Wales; A. S.

Shorney, Reading; L. S. Simpson, London; F. C. W. Stacey, London; H. O. Stallard, Leighton Buzzard; H. P. Simpson, London; C. M. Stratton, Edgbaston, Birmingham; J. N. Stringer, Taunton; F. S. Suttie, London; J. G. Tate, Tonbridge; W. H. Tomkins, Croydon; R. L. Turner, Market Harborough; J. G. Weall, Watford; H. P. F. Weaver, Padmore, near Stourbridge; W. W. Wheaton, Thames Ditton; T. A. Whitby, London; P. Whiston, Forest Gate, E.; C. A. Willoughby, Croydon; G. F. Wilson, Forest Gate, E.; J. P. Willon, Sefton Park, Liverpool; R. Wood, London; H. E. A. Woods, Sidcup; H. G. B. Wyatt, Chichester.

BRISTOL MASTER BUILDERS.—On the 30th ult., the annual meeting of the Bristol Master Builders' Association was held at the offices of the Bristol Chamber of Commerce, when the President (Mr. Geo. Humphreys) was in the chair. The Secretary (Mr. H. J. Spear) read the annual report, and on the motion of the President, seconded by Mr. E. T. Hatherley, the report and accounts were approved and adopted. The President proposed, and Mr. A. R. Krauss seconded, the election of Mr. George Wilkins, of the firm of Messrs. R. Wilkins & Son, as President of the Association for the current year. This having been carried, Mr. Wilkins briefly returned thanks to the members for the compliment paid to him. On the motion of Mr. W. H. Cowlin, seconded by Mr. W. Podger, Mr. C. A. Hayes was elected Vice-President for the ensuing year. By a motion which Mr. Humphreys proposed and Mr. Krauss seconded, Messrs. J. E. Davis, A. J. Beavan, J. James, and W. Galbraith, members of the committee retiring in accordance with the rules, were re-elected, and Messrs. W. Podger and E. Love to the vacancies caused by the resignation of two members. Mr. Humphreys was re-elected Treasurer by acclamation, and was also thanked for the manner in which he had carried out the duties of President during his year of office. The annual dinner was held in the evening at the Royal Hotel. Mr. W. H. Cowlin proposed "Our Civic Rulers." Mr. Pearson responded. Mr. E. G. Clarke submitted "Trade and Commerce," and Mr. G. H. Perrin, replying, said the figures published from time to time by the Docks Committee showed that the present financial year in the Docks estate was satisfactory in every way, and the contractors of the city would soon find employment in providing additional warehouses and other buildings. Mr. E. T. Hatherley in giving the toast of "Architects," wished them all success, and that the builders might share in their prosperity. Messrs. Henry Williams, W. P. Saunders, and Bligh Bond responded. Mr. G. Wilkins submitted "The National Association of Master Builders of the United Kingdom," and Mr. A. Krauss acknowledged the toast, and gave his hearers an account of the useful operations of the National Association. Mr. W. H. Brown proposed "The Bristol Master Builders' Association." The President, in response, reminded the company that unity of action was requisite to bring to a successful issue the object of any association; and in the case of the Bristol Master Builders' Society he thought their objects were worth some efforts to attain. He ventured to hope that the time would soon come when architects would have more confidence in builders, whose position was no sinecure, as they had to find the money and means to carry out the designs, and act as buffers between capital and labour. He believed it was recognised that the building trade was now the largest employer of labour in the country. The Secretary also replied. Mr. Wilkins spoke in terms of appreciation of the services of Mr. Humphreys as President and Treasurer, and asked his acceptance of an address, which Mr. Spear read. Mr. Krauss presented to Mr. Humphreys a solid silver cigar-case, bearing a suitable inscription, and a gold pen and pencil case. The Chairman acknowledged the gifts, and other toasts having been dealt with, the proceedings soon after terminated.

A HYDRANT FROST POST.—Our attention has been drawn to a stand-pipe made under this title by the Lambeth Brass and Iron Co., intended to serve on to a nozzle in the street-main for special supply of water to houses whose internal supply-pipes are frozen. The vertical pipe is of tolerably thick iron, and the taps on the cross-head at the top are protected from frost by an outer casing of thick metal with a space between that and the brasswork. The "Frost Post" can of course only legally be applied by the water-companies, and they are made with different nozzles to suit the gear of the different companies, several of which have some of these standards in stock, but do not apparently make much use of them. We hear already of houses which have been for some days without water-supply on consequence of the freezing-up of the supply-pipe. Use should certainly be made of any convenient means of drawing water direct from the main under special circumstances of this kind.

THE COMMISSION OF SEWERS.—The first meeting of the new Commission was opened on Tuesday by the Lord Mayor, when Mr. Gordon was elected Chairman. The remaining officers were subsequently reappointed. The defective drainage of report by the Medical Officer of Health, and on consequence of the estate being in bankruptcy there had been much delay in making the necessary repairs. It was now decided to instruct the con-

tractor to carry out the necessary repairs or reconstruction, the persons responsible being sued for the cost under the provisions of the new Public Health Act.

PRESENTATION TO AN ARCHITECT.—At a county gathering in Truro Town-hall, on the 4th inst., the Mayor of Truro (Mr. Silvanus Treval, a well-known West-country architect, was presented with a testimonial subscribed to by persons all over Cornwall. It consisted of a dinner, tea, coffee, and dessert services, a seven-light candelabra, and other articles, mostly silver, and a cheque for 100 guineas. The salver bore the following inscription beneath Mr. Treval's crest and the county and borough arms:—"This service of plate, together with a cheque for 100 guineas, was presented to the Right Worshipful the Mayor of Truro, Silvanus Treval, Esq., J.P., C.C., F.R.I.B.A., on Monday, February 4th, 1895, in the Town Hall, Truro, by the Right Hon. the Earl of Mount-Edgumbe, Lord Lieutenant of the County of Cornwall, on behalf of the subscribers, in grateful recognition of the valuable services rendered by Mr. Treval to the County during the Parliamentary Session, 1894, in the matter of the railway development of Cornwall." The service is in Queen Anne style.

PONTYPRIDD MASTER BUILDERS' ASSOCIATION.—The third annual banquet of the Pontypridd Master Builders' Association was held at the New Inn Hotel on the 31st ult. The chair was occupied by the President (Mr. D. Williams). Replying to the toast of "The Architects and Surveyors," Mr. Edward Rees, Surveyor to the District Council, urged that the County Council should at once grapple with the question of water supply. There was only a population of 8,000 in Pontypridd when the defunct Local Board was formed, but now it was 30,000, and he predicted that it would be 40,000 in another ten years. "The Town and Trade" was responded to by Mr. W. Jones, manager of the Pontypridd Waterworks, who referred to the many thousands of pounds which the Pontypridd Waterworks Company were about expending in the erection of a new reservoir. Before the close of the proceedings Mr. A. Richards was presented with a gold chain and pendant in recognition of his services during the past three years as Hon. Secretary of the Association.

NOTTINGHAM MASTER BUILDERS' ASSOCIATION.—The Nottingham Master Builders' Association have just held their annual meeting at the Mechanics' Institute, Mr. George Fish, the President, occupying the chair. The annual report showed that great depression still prevails in the building trade, although the progress of several large works in the town, the new Post Office, the Prudential Assurance offices, Borough Club, Messrs. Heymann's warehouse, and the railway extension, had kept the operatives fairly busy in several branches of the trade. During the past year a large number of well-attended meetings had been held, and many matters of great interest to the trade, such as the testing of drains, borough by-laws, working hours of artisans, laying of cement floors, Borough Engineers' printed instructions to builders, measuring timbers, worked stone brought into town, architects' quantities, uniform form of contract and arbitration clause, priced quantities, workmen's cheap railway fares, new builders' price-book, &c., had been brought before the members. The audited statement of accounts was submitted and passed. The President stated that in the past year the number of members had increased. He wished to acknowledge the courteous and kindly manner in which the Town Clerk and Borough Engineer had been pleased to receive the various deputations which had waited upon them. He mentioned also that the Association was closely allied with the Master Builders' Association of Great Britain. Mr. Enoch Hind was elected President, and Mr. James Wright Vice-President, for the ensuing year. Votes of thanks to the retiring officers closed the meeting.

CONSTRUCTIVE ART IN EARLY EGYPT.—On the 5th inst., before the Leeds Philosophical and Literary Society, Professor Goodman, M.I.M.E., of the Yorkshire College, gave a lecture on "Constructive Art in Early Egypt." Professor Goodman, in the course of his remarks, said that the city of Memphis was built by King Menes about 4,500 years before Christ, and about 500 years after the foundation of Memphis some of the pyramids were built, though the Sphinx, which was close to the pyramids of Gizeh, was in all probability built even earlier than the city of Memphis. From the specimens of their building, it was evident that at that early date the Egyptians were very highly skilled, and some of the work they did would have been creditable to modern architects and engineers; in fact, far more creditable than some of the work that was seen at the present day. The question naturally occurred how long could the Egyptians have been a nation, seeing that they showed such magnificent work as were the pyramids, even in an early stage of their career. Then the question arose what were the pyramids built for. The temple theory alone of the tomb theory would not hold, and the only conclusion that could be arrived at was that the pyramids were built partly as temples and partly as astronomical observatories.

STAINED GLASS WINDOWS AND PAINTED GLASS.—In the course of his third and concluding lecture at the Royal Institution on the 2nd inst., on "Stained Glass Windows and Painted Glass," Mr.

CONTRACTS—Continued

Those marked with an asterisk () are advertised in this Number. Competitions, p. iv. Contracts, pp. iv., vi., vii, vill., and xxi.*

roofing, having four long and four short sides, for holes which a reinforced hook is employed, the head of which constitutes a spring formed of two parallel branches between which the plate and battens are secured.

LABOUR IN THE MANCHESTER BUILDING TRADES.—Three sections of the workmen employed in different industries connected with the building trade in the Manchester district are agitating for an increase of wages and for alterations in the conditions of labour—the plasterers, who are affiliated to the National Association of Plasterers, the carpenters and joiners, and the painters in the Amalgamated and 4 Old Societies. The plasterers at present are paid at the rate of 83d. per hour, and their hours of work are in summer fifty-two and in winter forty-seven per week. They ask that the rate of pay shall be advanced to 90d. per hour, and that the hours of work shall be 50½ in summer and 44½ in winter. The workmen also ask for an alteration in the 10 per cent. allowance for reaching the work, and the operatives ask that the distance from the work to the house should be taken into consideration, and that an allowance shall be put at one mile. The painters ask for an increase of wages and other alterations.

TORQUAY.—For the erection of a church. Cockington. Mr. C. A. Nicholson, architect, 11, Beaumont-street, W. Quantities by Mr. J. E. Brown, 16, Great George-street, S.W.

	£	s	d
R. Wilkins & Sons	1550	0	0
S. Roberts	3250	0	0
G. H. Wilkins	3450	0	0
J. Brown	3440	0	0
Chas. Gicks	3471	10	0
S. Hawkins	375	13	0
James John	3435	0	0
Kallick & Brown	3425	0	0
A. R. Letbridge	3320	0	0
Wm. A. Cross	3350	0	0
P. Blower	3335	0	0
C. Crank & Sons	2698	0	0
J. Good & Co.	2900	0	0
Clange & Bloxham	2881	0	0
W. H. Gooding	2715	0	0
R. F. Yeo, Fleet-street, Torquay ..	2715	0	0

* Accepted.

WANSTEAD.—Forming-up Camden, Mansfield, and Sydney-roads, for the Wanstead Urban District Council. Mr. John I. Bressan, Surveyor, Wanstead. —

William Adams	250	0	0
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Estimate, 250/0. * Accepted.

TO CORRESPONDENTS.

C. G. (parts of) Islington, Hackney, Homerton, Kingsland, Dalston, Bloomsbury, Clapham, Wembley, and Blackheath are built on gravel, a model in the Museum of Practical Geology, Terry-street, gives the precise areas. "Puzzled" (next week).—

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

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VOL. LXVIII. NO. 275.

FEBRUARY 16, 1895.

ILLUSTRATIONS.

Paris Exhibition of 1890: One of the Three Premiated Designs.—By M. Hénard, Architect	Double-Page Ink-Photo.
New Synagogue, Berlin.—Messrs. Cremer & Wolfenstein, Architects	Two Single-Page Ink-Photo.
A House in Cleveland.—Mr. A. E. Street, F.R.I.B.A., Architect	Single-Page Ink-Photo.
Proposed New Tower and Aisles, Dewsbury Church, Yorkshire.—Mr. A. E. Street, F.R.I.B.A., Architect	Single-Page Ink-Photo.
House, Disley, Cheshire.—Mr. John Brooke, A.R.I.B.A., Architect	Single-Page Photo-Litho.
The Froebel Educational Institute, West Kensington.—Mr. John S. Quilter, F.R.I.B.A., Architect	Single-Page Photo-Litho.

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The Ancient Cambodian or Khmer Monuments in Eastern Siam.



N the region bordering on the great lake Talé Sap (sea of fresh water), which forms the part of Cambodia under Siamese dominion, there exist many magnificent ruins, some of religious, some of civil character. Of these many are well preserved, others are more injured by the centuries that have passed over them. The two sketch-maps show, one, the relative position of these monuments, the other, the position of this group of ruins in the Indo-Chinese Peninsula. The position of this group is between lat. 13 deg. and 14 deg. N., and long. 103 deg. and 104 deg. E. They are known as the ruins of the province of Angkor, and are situated in the modern Siamese province of Siemrap. Monuments of the same origin and characters are to be found in other places on the south and the east of Angkor, in proximity to the banks of some branches of the Mekong river.

The Khmer people are supposed to have arrived in the southern part of Indo-China, in the year 443 B.C.; their chief having been an Indian prince named Phratong, who was banished from Delhi by a usurper, and emigrated with great numbers of his countrymen (the annals say many millions). He found in the country a savage nation, mentioned by the name of Nagas, probably as worshippers of the serpent of this name, and the Chous; which nation, coming from the north, had invaded the country one century before. He is said to have made an alliance by marriage with the daughter of the chief of the Nagas, and to have defeated the Chous. Thus began the empire of the Khmers in Kamputch, or as we call it Cambodia, pre-eminent in ancient times amongst the great states of Indo-China, whose greatness is so impressed still, by tradition, in the mind of the natives, that they assert that it had twenty tributary kings, an army of five millions of soldiers, and that the buildings of the Royal Treasury alone covered an area of some miles. When Phratong settled in the country, he founded the city of Angkor Thom, which became his

capital and that of his successors. Under his reign the Khmers started the erection of some monuments, but the most important ones were not completed before the year 250 B.C.

All agree to attribute to the Khmers the construction of all these ancient monuments; the annals of Cambodia, the tradition, the interpretation of various inscriptions, all repeat the same tale, with the addition, however, that Angkor Thom was completed shortly after 443 B.C. (one century after the death of Sakyamuni, the Buddha), that is to say, a few years after the immigration of the Khmers. But the monuments at Angkor Thom and the surrounding places required certainly a long succession of years for their execution; and it has been suggested that some of them are due to the expelled race of the Chous. The latter, however, entered the country only a century before the Khmers, and must have had too much trouble in settling themselves in the country to be in a condition to give attention to works of art, and their degree of civilisation was not so high then as to enable them to conceive and to execute such monuments. The Chous, who were Brahmins, did certainly some good work of the kind, as is proved by some ruins in Viengchang and other places, but probably it was in imitation of the Khmers.*

In conclusion, it may be taken as matter of fact that the Khmers, at their immigration into Cambodia, did not find any stone monuments, or at least any monuments of any importance, and that the stone monuments of Cambodia are due to the ancient Khmers, to the exclusion of any other nation. The better conceived and better constructed were erected by them between the second century before and the third century A.D. The more recent and less important ones date from the first to the tenth century A.D. From this time a rapid decline, due partly to the influence of Buddhism, is noticeable in the brick pyramids and other brick works, which are inferior in merit to the ancient stone constructions. It would seem that the ancient religious monuments were in their

* The writer knows of an ancient sanctuary, half-ruined, which lies in the midst of jungles in a district inhabited by Chous, in Siam proper, and erected by them. It is placed about 40 miles east of the Bang Pak Kong River, about 13 deg. N. lat. This sanctuary has all the Brahminic characteristics of the Khmers' temples, and contains a statue of Vishnu. A Sanscrit inscription, which may throw some more light upon the history of the country, is still well enough preserved, but circumstances prevented a copy of it being taken.

origin dedicated to Brahminism. In fact, at the arrival of the Khmers, the reform of Buddha dated little more than a century back.

There is no mention in the annals of the religion of the Khmers at this time, but it is known that they spoke Sanscrit, which was usually the language of the Brahmins. On the other hand, the annals of Cambodia and those of Siam say that Buddhism was established there very early; other traditions say by Buddha himself, the date of this fact being stated as 542 B.C. But it must be remembered that the reform of Buddha suppressed by degrees only the old Brahminic faith, and, probably, in the temples statues of Buddha were erected when the gods of the Brahmins were still worshipped. Thus, an inscription at one temple, that of Wat Eck, mentions Vishnu and Buddha.

The recorded facts speak in favour of a Brahminic origin, but the more eloquent ones are the disposition and ornaments of the stone temples, the bas-reliefs representing heroes of the sacred poems of India, and the statues of gods of the Brahminic pantheon. In conclusion, it appears that they were specially dedicated to Vishnu and Siva, and that the statues and emblems of Buddha were introduced afterwards.

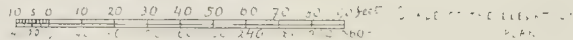
The principal material used in the construction of the ancient monuments is stone of a grey colour, and another of a slightly pink colour. Both are easy to cut in the quarries, and become hard after exposure; the alternate action of wet and dry, however, in course of time, injures them. Their grain is fine, and they can be well polished. Good quarries are to be seen some fifteen miles east of Angkor Thom, where the traces of the old works are visible. Probably there are many other quarries in proximity to the various edifices, now hidden by the vegetation. The freestone was used in the construction of temples, palaces, towers, &c., and was cut in regular-shaped blocks of various dimensions, often measuring 6 ft. by 3 ft. by 4 ft., sometimes much more. No cements were used.

The stone from Bienhoa, an iron concretion, was used for rough walls, roads, &c. The more yellow and that presenting a rougher grain was preferred. It is very abundant all along the valley of the Mekong River. It varies in its mode of conglomeration and colour.

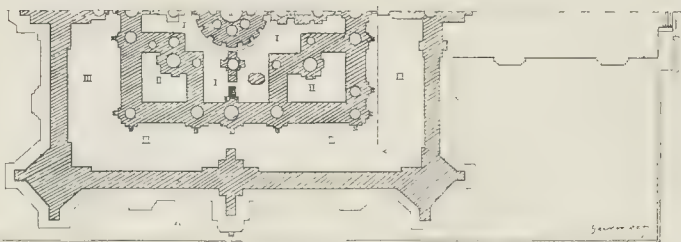
Bricks were not used in the construction



ELEVATION AB



- III LEVEL OF THE GALLERIES
- I AND PART OF THE STAIRS
- II - - - - -
- I - - - - -
- IV - - - - -
- POSITION OF THE POWER



Bang Yang, inside the City of Angkor Thom.

of great monuments in the districts where stone-quarries are in existence. They were used at a later period in these places, and sanctuaries of secondary importance occur constructed with bricks. But in other parts of Cambodia, where stone-quarries are not to be found, there are some important brick buildings, perhaps contemporaneous with the stone ones. The bricks are of about 1 ft. by 8 in. by 3 in. The Khmers, although they made very good bricks, did not use tiles in the roofs of their stone monuments. They used to cut the exterior of the stones so as to give the appearance of enormous curved tiles. Wood was used only for doors and windows.

The span of the vaults is never more than about 12 ft. or 14 ft. wide. The columns supporting the vaults are of a square shape, though round columns are used as ornaments only. The passages are high over the ground, the sides are covered and supported by stones of Bienhoa or by freestone, showing horizontal mouldings. The plans of the temples have in general a rectangular shape, one side a little longer

than the other. The principal axis is placed in the direction from east to west, and the principal façade and doorway on the east. Angkor Wat is an exception to the last rule, having its principal front towards the west.

The combined plan of the terraces, sanctuaries, porticoes, forms sometimes a Latin, sometimes a Greek cross. Both here and in the west these shapes are probably taken from the Brahmins. The towers have various shapes, but in general the base is square, and the shape is modified in successive stories till it becomes circular at the top. In elevation the upper part presents often an oval shape, or that of the bud of a lotus, the sacred flower.

The principal definitions in relation to Khmer architecture may be given as follows: The *Phrasat*, known as *stupa* by the Indians, is a sanctuary covered by towers. It contains a small vaulted room and an altar in it, under which were often buried kings or princes, or other persons of high rank. Vases of gold and silver, containing ashes, have been found in these apartments.

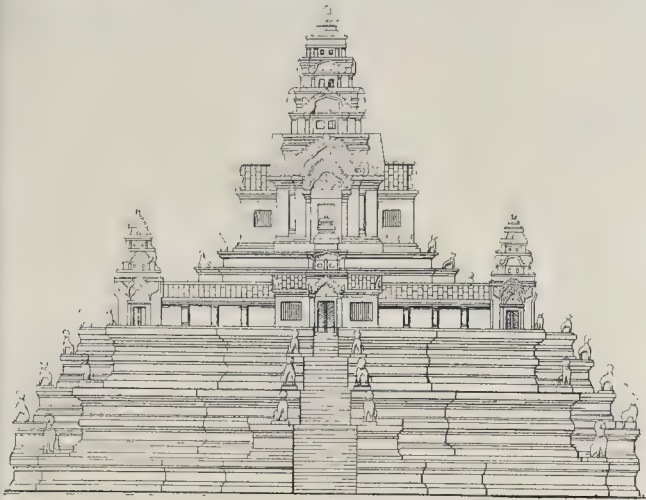
The *Chidays* are specially funerary monuments.

The pyramids are monuments consecrated to Buddha in memory of some conspicuous occasion, and ought to contain relics.

The *Sras*, of pure Brahminic origin, are sacred water reservoirs, and many are to be found in all the ancient temples. The *Cuehas* are sacred grottoes.

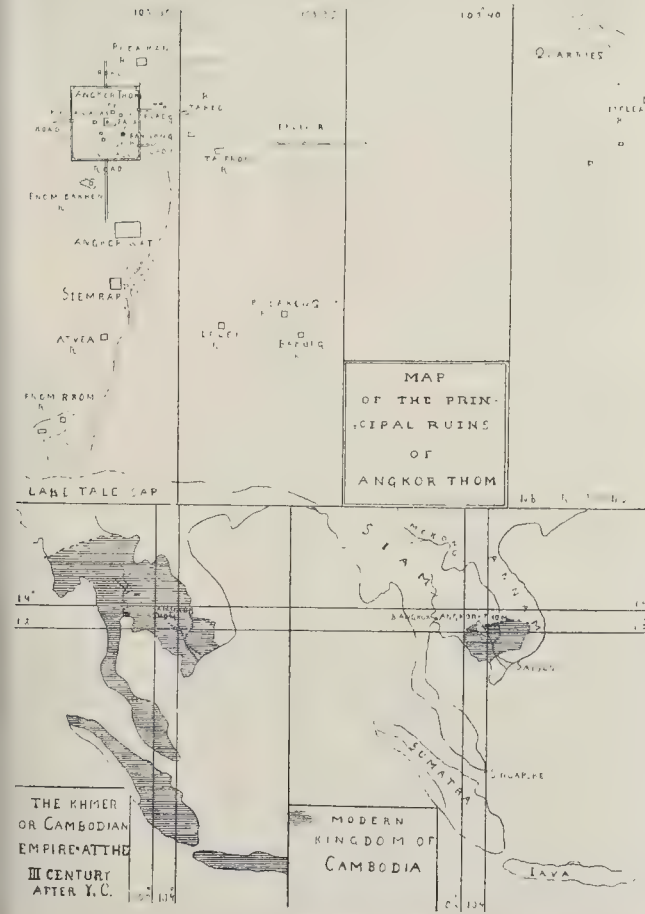
On the grounds surrounding a temple, at the doors of the sanctuaries, &c., there are to be found statues of lions of different sizes, and of the demi-god Ganesa. The Khmer lion is very muscular, and has no mane. Ganesa, son of Siva and Parvati, is represented with the body of a stout man with the ears, trunk, and tusks of an elephant. He is covered with a three-storied tiara with a globe on the top.

A many-headed serpent appears often in the ornaments of temples and other monuments; sometimes as a seat for a god; sometimes as the symbol of eternity with its tail in its mouth, often with seven heads, sometimes with more. The serpent appears often as a stone balustrade in terraces, roads



Dinean Acas, inside the City of Angkor Thom.

10 20 30 40 50 60 feet



bridges, &c., and is supported by cubic blocks of stone, or by statues of giants. Its heads are erected with a threatening expression.*

The three-headed elephant is another interesting ornament. In the illustration of the restored city gate of Angkor Thom, the triple elephant is to be seen at each side, acting as a kind of caryatid. The ape is also frequently represented in carvings on the temples; sometimes a battle of apes and men.

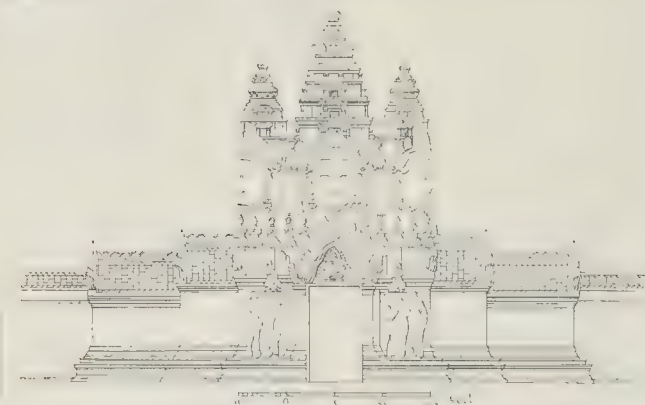
Angkor Thom, the ancient capital of the Khmer kingdom, is placed nearly three miles to the north of Siemrap, the modern capital of the province of the same name, which belongs to Siam, and nearly six miles from the lake Tale Sap. Angkor Thom is now deserted, and, except for a small village among the ruins, no vestiges of life are to be found inside its walls. The ancient wooden residences of the noblemen, and the bamboo-houses of the people, have completely disappeared, but some stones show still the holes where the wooden columns were fixed. A small river flowing into the lake passed close to its walls, but the town by its position was not exposed to the periodical inundations of the lake. The rectangular walls as well as some of the gates of the city are still well enough preserved. The sides running from east to west are a little longer than the others. The city is supposed to have been fortified, but bastions and other works of this kind are not to be seen. The walls are about 20 ft. high and 12 ft. wide on the top, and sustain inside an earthwork 15 ft. high and 50 ft. broad on top. Many square conduits of good masonry crossed these works, and discharged the waters from the town into a canal, which surrounds the walls on all their length and is about 360 ft. wide. The walls have a circumference of about seven miles. They are constructed with iron conglomerate (Bienhoa stone) and in the upper part crowned with freestone. The canal, which is full of water during the rainy season and is never dry through the whole year, contains many alligators. Five roads come out from the town through five gates. The bridges crossing the canal and the roads are about 50 ft. wide. They have an enormous balustrade on both sides, consisting of a colossal seven-headed stone serpent supported by stone giants, some of them many-headed. Each balustrade has fifty-four giants, making for five roads a total of 540 colossal statues sculptured with astonishing skill, though in a savage and barbarous style of grotesque exaggeration.

The gates of the city offer a passage about 12 ft. wide. Their crowning towers are supported on a square base. Each tower represents four heads of Brahma. Their exterior walls are covered with ornament, the interior is plain. The base represents two three-headed elephants. These magnificent gates are all constructed with the finest freestone. The eastern wall has two gates, one called the gate of Victory, the other the gate of Death, probably because from it the dead were carried out. The other walls have one gate each. At the four corners inside the town there are the ruins of two circular buildings used as stores for material of war.

The ruins of the interior of the city still enable the visitor to appreciate in full the merit of its monuments. The more important of these are Bang Yong ("fine view"), Pinean Acas ("high place"), and Ba Puon. They were probably religious as well as civil monuments, as is often the case in this country, where people go to their temples for religious purposes as well as for meeting friends, and wandering about the buildings and gardens of the Wat.

Bang Yong is essentially composed of rectangular galleries containing in the centre a high and broad terrace from

* Casts of some of these serpent railings are to be seen at Paris, either at the Louvre or in the Trocadéro sculptur museum; they have been moved about a good deal.



City Gate of Angkor Thom.

which a fine view can be enjoyed. This terrace is surrounded by numerous towers of various dimensions, all profusely sculptured. The central one is really a marvellous work of art. Its height is about 130 ft. from the yards of the lowest gallery. This monument is perhaps one of the best erected by the Khmer. It is known also as the monument of the fifty-one towers. At the foot of the central tower there is placed a sra, or water-reservoir, which is an indication that an idol had once been there, of which all traces have disappeared. It seems probable that in this monument were buried the ashes of the kings. Pincan Acas is formed by three terraces superposed. On the higher there is erected a large tower surrounded by a small vaulted gallery from which a fine view of the town and neighbouring country is obtained.

Four flights of stairs, one on each side of this pyramid, lead to the terrace. It was probably a civil monument, judging from the absence of religious symbols, and the interior material employed in its construction. Only the high gallery and the tower are constructed with fine and regular blocks of freestone. This monument is placed inside the walls of the royal residence. Ba Puon has also the shape of a pyramid on a rectangular base. It is formed of seven superposed terraces, on the highest of which is erected a sanctuary, covered by an enormous tower.

The completion of the principal monuments lying inside the walls of Angkor Thom dates, in all probability, from the third century, B.C. The most important of the ruins, outside the walls of the city, is the temple of Angkor Wat, which was commenced in the second half of the first century B.C., and is considered as the best production of the Khmer architecture. Of this we may have more to say.

NOTES.

THE works in sculpture left by the late Thomas Nelson Maclean have lately been on view for private sale at his studio in Bruton-street, and are a reminder of his comparatively early death last November, after only eight months of married life. The son of an engineer, he was born in 1846 at Deptford. He first studied drawing under Mr. Sparkes, at the Lambeth School, and it was while there that, exhibiting a great taste for sculpture, his father, who wanted him to follow his own profession, at last gave his consent that Maclean should study at Paris. He worked there in various sculptors' studios, and was in Paris during the siege. On his return to London he produced several small terra-cottas, his first great success being his "Ione," exhibited at the Royal

Academy in 1879. Afterwards he spent three winters in Florence, executing his "Ione" and his "Spring Festival" in marble. This latter, to which we have before referred, is, it will be remembered, a translation into marble, life-size, of two figures in a well-known picture by Mr. Alma Tadema. Latterly, Mr. Maclean had been engaged on two large figures for India, viz., the bronze statue of Sir Arthur Phayre for Rangoon, the marble statue of Kristo das Pal for Calcutta. At the time of his death, he had just completed an ideal life-size figure of "Sappho," a remarkably successful attempt at strong expression in sculpture. Arrangements had been made before his death for casting the statue in bronze. His method was interesting, in that he generally executed a highly-finished model to a small scale, which was subsequently enlarged by the scale-pointer; much greater interest therefore attaches to the small models than to the sculpture. In place of a vapid classicism he preferred to give realistic character to his ideal figures, and in consequence some of these may be criticised as possessing the defects of average humanity; gaining, however, the interest attaching to semi-portraiture. The most classical of his figures is that of "Tragedy," while in general sculptural excellence nothing equals the "Ione," which first brought the sculptor into notice in England. His early death is a loss to English art.

MR. JUSTICE KEKEWICH has struck a somewhat severe blow at aggressive trades unionism. The case arose out of a recent strike among the men in Messrs. Trollope's employment, with which some of our readers are no doubt already acquainted. After the conclusion of this strike, the London Building Trades Federation issued a large poster with a mourning border, and headed "Trollope's Black List." This gave the names of non-union men employed by Messrs. Trollope, including men who had remained at work after the strike began. One thousand copies of this poster were printed, and 750 were distributed. It was alleged by Messrs. Trollope that the poster would injure their business, deter workmen from entering their employment, and the workmen complained that it would also injure them. The application was for an interlocutory injunction to restrain the further publication of this list pending the trial of the action. Mr. Justice Kekewich held that the poster was unlawful—in other words, it was not a thing in the nature of *bona-fide* competition or self-protection. In a recent case in the House of Lords, Lord Field said that if acts done under the guise of competition "are in themselves violent or purely malicious, or have for their ultimate object injury to another from ill-will to him,

and not the pursuit of lawful rights," they can be stopped by the law. Mr. Justice Kekewich was of opinion that the publication of the poster fell within the above principle. The principal motive of those who issued this poster was to injure those workmen who were mentioned in the black list, and also Messrs. Trollope, "and to prevent them from carrying on their ordinary trade or business with that freedom which was the privilege of Englishmen." It is to be hoped that this decision will be taken to heart by trade unionists all over England. No body of men are louder in their protestations and complaints at the smallest pressure from employers and capitalists; but they forget that there is a homely proverb, that what is sauce for the goose is sauce for the gander. The freedom of action which the trade unionists rightly claim must also be accorded to non-unionist workmen and the employers of labour. Trade unionists are not entitled to hinder non-unionists from getting work, or to injure them because of their opinions, and we have no doubt that this decision will open the eyes of many workmen who are inclined to tyrannise over their fellows.

THE frost of the last few weeks has been the cause of numerous kitchen-boiler explosions and of lamentable loss of life. From Dunston, near Gateshead-on-Tyne, Morecambe, Fleeton, and many other places comes news of such accidents, which have inflicted death or serious injuries on men, women, and children, besides causing great damage to property. The inquest on the two deaths at Morecambe elicited the facts that the boiler was of cast-iron, and had not a safety-valve fitted to it. Such boilers as this (and their number is legion) are in time of frost simply death-traps, and it is certainly high time that their use was prohibited. A safety-valve can be fitted to an ordinary boiler for less than ten shillings, and it is a shame that persons responsible for the erection of houses should submit the occupiers to such hideous risks for the sake of saving so paltry a sum as this. Yet it has been estimated that less than one per cent. of kitchen boilers are fitted with safety-valves, in spite of these annually recurring fatal events.

FROM particulars received of the progress of the work on the new docks at Portsmouth Dockyard, it appears that the contractors are experiencing unusual difficulties from water, which is no more than might be expected considering the site and the nature of the ground. A coffer-dam has been made which has been extended and strengthened several times. A new leak has occurred under it, and efforts have been made to stop this with bags of sand whilst the foundations have been cemented. It is said to be almost hopeless to try to keep the water out, judging by past experience, for as soon as the leaks are stopped in one place they appear in another, and altogether the constructors of the dock seem to have rather troublesome times in store.

IN the current volume of the Proceedings of the Institution of Civil Engineers some particulars are given from an American source of the difference in ease of traction between various descriptions of roadway. According to Mr. Rudolph Hering, if a horse can just draw a given load on rails laid on a level road, 13 horses will be required to draw the same load under similar conditions on asphalt, 31 horses on the best Belgian block pavement, 7 horses on good cobble stones, 13 on bad cobbles, 20 on an ordinary earth road, and 40 on a sandy road. Taking these and other facts into consideration, the writer is of opinion that an asphalt pavement can be laid and maintained in first-class order, and renewed when necessary at a smaller cost than granite blocks. It is stated to be well established that asphalt

costs 20 per cent. less than granite or ordinary wood to keep clean, and the greater cleanliness thus insured is a sanitary gain. Asphalt is also impermeable and non-absorptive, is noiseless, and is not subject to organic decay. The lesser wear and tear on vehicles as compared to rougher pavements has also to be considered.

SOME modified rules as to Organised Science Schools have been issued by the Department of Science and Art, and will take the place of the existing paragraphs 22 to 28 in the "Science and Art Directory." The most important feature in the new rules is the introduction of payment on inspection instead of payment by "results." We presume that "results" has a special official meaning in the vocabulary of the Department, as in the ordinary sense of the word the payments are still by results, consisting of a variable grant of 2*l.*, 1*l.* 10*s.*, or 1*l.* per student, according as the student is reported "excellent," "good," or "fair." The real difference seems to be that the report will depend on the personal visit and examination of an Inspector. An "Organised Science School" is one in which the instruction is carried on methodically according to one or other of the courses laid down in the new rules. Other modifications of existing rules are to the effect that provision is made for a certain amount of literary instruction being given whilst the student is pursuing his Science curriculum; that greater freedom is given to the teacher as to the syllabus he is to teach in the first two years of a student's course; that a choice of advanced courses is given, and an alternative programme suitable for women formulated, and instruction in subjects specially adapted to them is demanded; and that practical instruction must be given in the subjects taken, simultaneously with the theoretical instruction.

THE decision of Mr. Justice Kekewich in the recent case of *Farmer v. The City and Waterloo Railway Company* is of great importance to the public in view of the promised legislation by Parliament for facilitating the construction of light railways. In recent years Acts have been obtained by electric railways authorising them to "appropriate and use" the subsoil under private property without purchasing the surface or any buildings thereon. The Act of the Waterloo and City Railway Company left the question open as to whether the land was to be appropriated with or without payment. It seems now settled authoritatively that the "appropriation" can only be made by purchase, even when the boring is at a great depth, and the soil quite valueless and inaccessible. An injunction has been granted against the company, and the question of the price to be paid will probably be settled by arbitration. Without an Act of Parliament no one can take from an unwilling landowner any of his subsoil, or can obstruct his view of the sky overhead, for as the judge stated, it is a legal maxim that the ground is the landowner's from the centre of the earth to the heaven. Hence he might refuse to part with the subsoil unless the company purchased also the land vertically overhead and the buildings on it. Railway companies have had to do this in many cases. As we have said, recent legislation has been in the direction of modifying this maxim, and the promised legislation in connexion with the construction of light railways will probably modify it still more. For any actual injury or annoyance, landowners will probably always be able to claim compensation, but as to whether owners of a valueless and to them inaccessible subsoil in agricultural districts could have their rights over it curtailed without injustice, seems a question well worth the consideration of Parliament.

THE severe weather has afforded one of the London water companies a brilliant opportunity of showing the public how fully

capable a water company can be of indifference to the difficulties of the householder in maintaining a supply of water under very trying circumstances. It is the practice of many tenants of middle-class houses in which the water-supply arrangements are rather defective, to leave the tap slightly running in order to prevent the water, as far as possible, from freezing in the pipes and thus cutting off the supply. The West Middlesex Company served a notice the other day on householders in West Kensington Park (amongst other places), which notice was in the nature of a threat, and reminded them that to leave taps running led to great waste of water, whilst it was illegal. The notice also stated, in effect, that great pains and penalties would devolve on anyone detected in such malpractices. The inhabitants of the district in question were not so easily frightened, however, if we may judge from the subsequent action of the water company. In the dead of the following night, or the next, the company shut out the water for a few hours from certain portions if not from all the district. This was a very cowardly act, for of course it stopped the circulation, promoted freezing in pipes, and thus effectively cut off the water from many houses for the past week or two. We are informed that the houses referred to come under the constant service system, which only aggravates the case. No one could object to the prosecution of habitual water-wasters, or where, through sheer negligence, taps are allowed to run for months together; but surely it is not too much to expect a little indulgence during such seasons as the present. No Corporation under public control would dare to behave in such a fashion. In a few years' time the public will be able to control circumstances of this kind, and the sooner the better.

THE set of pictures by Sir E. Burne-Jones illustrating the legend of St. George and the Dragon, which are on view at Mr. McLean's Gallery in the Haymarket, were, we gather, painted many years ago, though only now first exhibited. They are very unequal in conception, and in some respects in execution. In regard to the first, "The King's Daughter," it is really almost absurd to print lines implying a beauty almost beyond description—outbidding that of the famous three on Mount Ida—and to illustrate them by a figure of a thin, lank damsel, with no special beauty of either expression or physique; and the three succeeding pictures seem to us to fall almost as much below the suggestion of the legend. The fifth, the princess tied to the tree, has much more of the sentiment of beauty; and in the fight with the dragon the painter has achieved a fine St. George and an original and sufficiently loathly dragon; though here again the picture is rather spoiled by the affected attitude of the watching princess. This study of the knight and the dragon appeared on a smaller scale, in water-colour, at an exhibition of the Society of Painters in Watercolours; the dragon was then treated in much darker tones, and, as we observed at the time, looked rather like a colossal cockroach; the present study is what would be called, in the slang of the modern newspaper critic, more "convincing." The last picture of the series, the princess and her deliverer returning with a procession of joyful maidens, is quite the best of the set. The princess has in this more pretensions to exceptional beauty; the movement of the various figures is animated, and the effect of colour rich and effective, though it is perhaps rather too conventional an expedient to make the knight's red cloak blow back from his shoulders (to form a background for the princess's head), when there is no other sign of wind in the picture. But painters will do these things.

THE exhibition of dry-point etchings by M. Helleu, to be seen in Mr. Dunthorne's miniature gallery in Vigo-street,

should not be overlooked by those who enjoy the study of æsthetic rarities in artistic conception and workmanship. A few of M. Helleu's heads and other studies have been seen in London for two or three years past at the exhibitions of the Society of Painter-Etchers; but at Vigo-street there are nearly sixty of them collected, and they are nearly all worth looking at. M. Helleu's certainty and freedom in the use of dry-point etching, his power of modelling and foreshortening a face by line only, are in themselves remarkable; but there is a poetic interest in them beyond that of mere cleverness of execution. M. Edmond de Goncourt, in a brief but charming preface to the catalogue, describes Helleu's art as being "une sorte de monographie de la Femme dans toutes les attitudes infinies de son chez soi"; or as he sums it up at the close, "les instantanés de la grâce de la Femme"; expressions which very aptly describe the nature of the interest attaching to these etchings. None of them are highly finished, sometimes we have only a head and just an indication of the rest of the figure; but in all there is character, expression, a happy movement or pose seized on the instant, a beautiful face commemorated. Look at the grace, the character, and the easy naturalness of the sketch of "Femme au Chapeau Couchée" (9); the remarkable vivacity of expression conveyed in a few lines in the head of the "Jeune Fille Assise" (16); the "Profil de Femme au Chapeau" (25); the expression of thought and study in "La Sonate" (29), the beautiful heads of children, especially No. 34; the bold free sketch of a girl's head in No. 38; the piquant humour of "La Salutation" (47) where a merry girl shakes the paw of a dog. M. Helleu seems rather fond of exhibiting sometimes his mastery over difficult positions, as in the "Femme Enfilant une Aiguille" (54), where the face is in shadow and foreshortened, and the "Femme à la Tasse" (10) where the face is half hidden by the cup. But in general the object of these masterly etchings is beauty—the beauty of evanescent moments of pose and expression, seized on the spot and perpetuated in these delightful line memoranda.

THE *Daily Chronicle* has launched out with considerable success into the new movement for producing block illustrations in daily papers. The large block in its issue of Monday last, a representation of "Labour," from a drawing apparently made for the purpose by Sir E. Burne-Jones, was a great success, being drawn in the large and bold manner which has the best chance of printing well under the circumstances in which a daily newspaper is necessarily printed, and it is the best thing we have seen produced as a daily paper illustration.

THE ADVANCEMENT OF ARCHITECTURE.*

BY PROFESSOR AITCHISON, A.R.A.

By these lectures I not only hope to stimulate your industry, intelligence, and enthusiasm, but to give you some practical hints of the studies it may be useful to pursue, to put vitality into architecture and to improve it. The æsthetic part of architecture is by far the most difficult to treat, as it is of the vague rather than of the clear and definite order of things, and there has been little written on the subject that is of value. In dealing with materials, for example, you can measure and weigh them; you can by experiment find their strength in compression, tension, and cross strain; you can see how much water they will absorb in a given time; and how much they will lose by a given heat in a given time. If a great number of experiments have been made, and if you have experience, you can tell, if you use the greatest care in their selection, what to allow for variation in the quality of the materials, and for bad workmanship; and if the materials are not new you can see what deterioration takes place through time

* Being the third Royal Academy Lecture on Architecture this Session. Delivered on Monday evening, February 4, 1895.

and exposure, and then, if your statical calculations are right, you can be certain that your building will stand provided there are no exceptional tempests or an earthquake. By tabulating the experiments on wrought-iron and steel, and by a judicious application of the laws of statics, the great suspension, tubular, and girder bridges, as well as those gossamer-like structures, such as the Crystal Palace, have been built, and have not only stood, but have been the wonder of mankind. But to make structures, or parts of structures, that answer all the former purposes and move or delight the beholders as well is in quite another category. In one case you have definite and calculable forces to resist, in the other you have to touch the unknown springs of certain emotions. You can only judge what is likely to please by what has pleased, and you have to find out, if possible, not only why they have pleased, but what are the underlying principles that have made them please. If we could discover these principles then aesthetics would be a science that everyone could learn; at present it is an art that only exceptionally gifted persons can acquire by study and instinct. In dramatic literature two of the highest aims are to make the reader cry or laugh. Horace says if you want your hearers to cry you must first cry yourself; but though many treatises have been written on the cause of tears or laughter, the manner of producing these emotions has not been reduced to a science. Now those writers who make you cry or laugh are considered to be geniuses; when this art becomes a science, the producing tears or laughter will be looked on in the same light as shoeing a horse or mending a kettle. Swift in his "Letters to a Young Clergyman" says:—"I cannot forbear warning you, in the most earnest manner, against endeavouring at wit in your sermons, because, by the strictest computation, it is very near a million to one that you have none." Perhaps that would be good advice to all who consciously seek for what is called originality, which is mostly attained by exaggeration, disproportion, and oddness of arrangement; real originality only comes from original minds, and will, in that case, show itself spontaneously in the witty; for surely those original architects, who have only been able to raise in us emotions of contempt or disgust, would have been judicious had they abstained from the attempt. I think that most architectural students, if they will only study the best buildings, will make their plans to accurately answer the purposes wanted, including the efficient lighting of the rooms, will study the Vitruvian symmetry until their eye revolts from disproportion, will try and make their profiles tell the story they want told, and will try and bring such parts that, from the exigencies of the case, obtrude themselves in odd places into harmony with the whole, that they will produce an effect which will raise their buildings to the dignity of humanity, and out of the range of the dog-kennel and rabbit-hutch type, and will not exhibit ugliness, disproportion, or vulgarity. We see plenty of examples where the designs have sunk much below this level; no building of dead walls, with holes in it for doors and windows, could cause us such disgust. Let me here say, by way of a parenthesis, that if you candidly consider that your design is more offensive than a dead wall, do not waste money and materials in making the wall more repulsive, but let it alone.

I propose to attack the problem of symmetry historically—at least from Greek times. The first treatise on architecture, that has yet been discovered, is that of Vitruvius, though we know from him that several Greek architects had written treatises, some on architecture generally, and some on the particular monuments that they designed. We must suppose that from the earliest civilised times, certain ratios of length to breadth, and of openings to solids in the outside of buildings, had been more admired than others; and that when the insides of buildings were light enough to see in, certain proportions of length to breadth and height had been found to be more agreeable to the eye than other ratios; that long before Greek times some rules of agreeable proportions had been deduced. In Vitruvius we see that rules for the relative proportions of buildings and their parts was a part of architectural teaching; and had been applied to all large objects as well, for he tells us that in ships the distance between the tholes was taken as the module. (Vit., lib. 1, cap. 2, p. 4.)*

* I use the Leipzig edition of 1867 by Rose and Müller-Stöhring, with which a concordance by Nohl, 1876, is bound up, and which is in the Library of the Royal Institute of British Architects.

Vitruvius's directions for finding the module in Doric temples is as follows:—"The part of a Doric temple where the columns are placed must be divided, if tetrastyle, into twenty-seven parts, if hexastyle, into forty-two; of these, one part will be a module. . . . The distribution of the whole work is effected by the nature and regulation of this module, the thickness of the columns, is two modules, the height, including the capital, is fourteen, the depth of the capital is one module, its width two and one-sixth modules, the thickness of the capitals is divided into three parts, of which one is the plinth and its cymatium, another the echinus with its annulets, and the third the hypotrachelion or necking. (Vit., lib. 4, cap. 3, pp. 3 and 4.)

For eustyle temples he gives another recipe for getting the module. He says:—"The front of the temple, if tetrastyle, is to be divided into eleven and a-half parts, exclusive of the projections of the bases and plinths; if hexastyle, into eighteen parts; if octastyle, into twenty-four and a-half; and from these parts, whether tetrastyle, hexastyle, or octastyle, one part being taken will be the module." (Vit., lib. 3, cap. 3, p. 7.)

Vitruvius also says:—"The design of temples depends on symmetry, the rules of which architects should be most careful to observe. Symmetry arises from proportion. . . . Proportion is a due adjustment of the size of the different parts to each other and to the whole; on this proper adjustment symmetry depends. Hence, no building can be said to be well designed which wants symmetry and proportion" (Vit., lib. 3, cap. 1, p. 1). Nothing could be better calculated to ensure this Vitruvian symmetry than by making a module from the whole width of the building, and using that measure for proportioning every part; and it is without doubt greatly due to this that Classic buildings have always been so much admired. There can be very little doubt that all nations who have been sufficiently civilised to require many large and important public buildings, have adopted some such plan of proportioning as that given us by Vitruvius. It is most likely that after his book was published, the methods of proportioning he gives were never permanently lost. Viollet-le-Duc is of opinion that some such scheme of proportioning was used in the Middle Ages, and although Cesare Cesariano was a Renaissance architect, the methods of proportioning that he gives us as being used at Milan Cathedral, were doubtless the traditional ones handed down from the first founding of the Cathedral. I do not think it can be doubted that many of the proportions that Vitruvius gives were originally founded on structural reasons; that is, from the sizes of parts that had been found to bear the weights on them without failure; in fact, Vitruvius tells us that the usual proportion of the architraves of temples was too slight, when the columns were far apart, and that wood must then be used instead of stone or marble.

All these proportions that Vitruvius gives us, and his description of symmetry, are old stories; but the question is this, is this knowledge used? Does every architectural student get his module from the front of his building, and does he use this module to proportion every part? Do architects in practice get a module and use it? What I want to impress on you is this, that this part of aesthetics should be so studied by the student before he practises, that his eye is as impatient of disproportion as a musician's ear is to a false note; the student's eye should, like Michelangelo's, serve him instead of a pair of compasses; not to save his time over designs in deceased styles, but to enable him to make the proportions fine when problems that have never yet been solved come before him.

In early Romanesque days, when the traditions of the Roman architects and of their proportions had probably been temporarily lost, new proportions were adopted, often from logical considerations. The barbarians had noticed that columns always carried something, so in basilicas they carried the columns up to take the trusses of the roof, as the only things there were to be carried. In spite of the early Romanesque work being rude, most impressive internal effects were often obtained, and it is doubtful if the most skilful Gothic ever produced the effect of grandeur that was attained by the best Romanesque.

In Gothic, again, the architect's knowledge of the strength of stone made them adopt different proportions from the old Classic ones; in some of our cathedrals isolated shafts rise to a height that many now would scarcely venture on in cast-iron. There is a Purbeck column in the chapel at the west-end of the north aisle of Lincoln, whose plan is a cross only 18 in. in diameter, which bears half

the vaulting; if this were of Vitruvian's proportions, it would be circular, and probably 3 ft. or more in diameter. It has not the grace of a column of the Erechtheum, but it is original and striking from its slenderness and from the skill in construction that it suggests. If the proportions that charmed the eye of the most cultivated Romans were the only true proportions, we must still keep to them; but we know they are not, for the proportions of Greek architecture were finer and different, and I think it must be obvious that fine proportions that can charm an educated eye are infinite, though there is a much greater infinity of bad ones.

There is not a reed nor a flowering grass that grows that has not a different proportion and treatment from that of any other species, and yet most of them are lovely: why should we not learn lessons from them? It is partly from the necessity of new proportions, new mouldings, and new methods of enrichment being wanted for iron, that I am anxious to see it more used; this material compels us to find them if iron is to be used aesthetically. Still, it would apply in a lesser degree to every material, old as well as new, if we used them according to our increased knowledge and our present taste. Let me put in what I consider to be a reasonable plea for the study and use of iron. Every architect who has to do with large or complex modern buildings has to make curious shaped stanchions, and other pieces of ironwork, to solve some difficulty in his work, and, as often as not, this stanchion or piece might remain uncovered if it could be brought into an agreeable or striking shape; but the art of doing this has not been learnt, so it is covered with terra-cotta, plain or enamelled, it is built into a brick pier, plastered, or cradled and matchboarded, and no longer tells its tale, nor affords the opportunity for original design. The shapes of parts of buildings is another branch of aesthetics that should be much more studied and practised, so as to conduce to the proper expression of a building. You may want to make a building look sublime or dignified, beautiful or elegant, strong or light, grim or terrible, and the parts or features should conduce to this end, and if you can give originality as well, so much the better. In modern English buildings originality is often shown, and so is grace, but these qualities too often merit the remarks of the critic on a book that professed to contain matter that was original and true: he admitted that it did contain both elements, but said that, unfortunately, the new matter was not true, and the true matter was not new. Any one can be original if he be only impudent enough; any one can be graceful if he is servile enough to copy, but to be both original and graceful requires deep study, much striving, and natural talent.

The Italian Renaissance architects did a good deal to improve and beautify the outlines of buildings and of their parts; but the task of the Italian Renaissance was peculiar—it was mainly to reconquer the knowledge and skill of Classical antiquity; and the Italians started this in so vigorous a way that after a century what they had begun was taken up by the whole of Christendom, and thanks to them we have this priceless treasure to our hand; but the value of the treasure they were reclaiming, and the necessity of devotion to this task, wholly absorbed them. Having got the treasure, it hardly becomes us to object to their admiration of it, which almost amounted to adoration, for without that exaggerated feeling it would probably have been lost; but it no longer behoves us "who rift the hills, and roll the waters, flash the lightnings, weigh the sun," to pose as poor idiots who can never hope to equal Roman antiquity, or even the work of the semi-barbarous Middle Ages. Our mental attitude should be this—we may have our shortcomings, but we shall be able, if we study and strive, to do better than these people. The ferocious Saracens have given us a new phase of architecture, all of it after they created a style, wonderful and much of it beautiful; even the Tartars have given us new phases of architecture in the far East, whilst the Mediaevals have shown us that all forms of piers were not restricted to the square, the oblong, and the circular, nor were all the emotions that could be called forth by building exhausted by the Greeks and Romans. The devotion to work that the Italians had at the Renaissance, we should not envy but imitate; and I have no doubt that the same frantic energy was displayed at the beginning of the Gothic Era. Inigo Jones took Petrarch's line as his motto, "I know of no pleasure but knowledge," and if we would not only take the motto, but act up to it, I cannot

* Altro piacere che conoscer non trovo.

help believing that in a few generations we should make such strides as to astonish the world.

Domes that form a part of the interior effect are mostly ugly or insignificant outside, as we see at the Pantheon, and at Sta. Sophia, but when the constructive skill of architects enabled them to build domes on drums, and to cap the domes with lanterns, the whole feature made up of drum, dome, and lantern, formed, in the hands of the skilful, very beautiful objects, both from the ratio of their parts, from the variety of their shapes, and from the beauty of their outline. In some Gothic spires you see the striving of the architects to correct the baldness and crudity of plain elongated pyramids: all sorts of devices were used, by means of pinnacles and dormers to break the bald line, and to intersperse agreeable shapes at different stages in its height. I particularly speak of the importance of striving after appropriate forms for parts and for outlines, as there is a fashion among some of the new school to use proportions and shapes that might be used by a very low kind of savage; the general outlines of their buildings are without form, while some of the parts are adorned with what might be called architraves, unmoulded, thick, and square in section, or still worse with the outer edge rounded, even when the material is marble; these rude and disproportioned masses are used to enclose a small fireplace, a bas-relief, or a panel of beautiful tiles; in buildings, too, where there is in some parts a certain refinement, this is only shown to show simplicity or power, when it only shows clumsiness and want of taste. The materials that these lumps surround are sometimes in accordance with the shape—bare fire-bricks or clinkers a foot or two wide, put round fireplaces in rooms with elegant cornices, velvet curtains, and inlaid or carved cabinet work; such things are only admissible in a tap-room or a workman's dining-hall. This is not the crimson patch to catch the eye, but the imperial velvet elked out with fustian; though possibly used with the same intention.

It is a little incongruous to see a Greek temple as a park-keeper's lodge, still the parts are well-proportioned and elegant if they be inappropriate; but to see a millionaire's mansion of a rudeness that bespeaks the work of the village bricklayer, carpenter and blacksmith, where perfection should dwell, is not only inconsistent but scandalous. The designing of furniture and of utensils is a useful exercise, for in it you have to meet the exigencies of curious shapes and requirements—for instance, in a chest of drawers, a library writing-table, or an umbrella-stand.

At Pompeii everything, from a patty-pan to a gladiator's helmet, was made a more or less beautiful object, while nothing exceeds the grace and dignity of the marble chairs of the Theatre of Bacchus at Athens, though these chairs are perfectly plain and simple, and the bathing-chairs of Caracalla's baths are elegant.

I have also to remind you that architecture cannot be brought into vigorous life again, so long as architects insist on using old forms for beauty that are inseparable from a construction that has been abandoned; so long as this practice persists, so long will architecture be a kind of potted art; to be vigorous, it must learn how to take the materials and construction that would be ordinarily used in buildings for purely practical purposes, and give to these materials and this construction forms that will excite the proper emotions. You must not suppose that I mean that if you have a vast hall, or what not, that because you can put an iron trussed roof over it from wall to wall, that this will make it into a hall that will raise emotions. You will only get a railway platform or a coal-shed. You have got to set your wits to work to see how it is to be properly brought within the pale of aesthetics, and not only as to the shapes and proportions of the parts, but the dividing of the whole by supports. It is probable that if you were obliged to vault a cathedral in stone, with no more money than was necessary, and to have a clearstory to it, that you could not do it cheaper, and perhaps not better, than the Gothic architects did it; but to vault such a building in stone when you could do it much cheaper and better with iron ribs and concrete, is, in my opinion, dilettante art. Groins are not beautiful things, but on the contrary are ugly, and we should wish to obviate their ugliness if we could, but when they were merely unavoidable methods of cheap construction, we admire them for the invention and skill of their architects, and we have, to some extent, got to love even their ugliness from old association; though perhaps the ribs at Westminster Abbey, as seen from the west end, are not offensive.

One of the things I have repeatedly recom-

mended for learning architecture is paraphrasing fine buildings. Writers who want to get a good style paraphrase the best authors of their own country, besides making translations when they know other languages. We do not want to paraphrase Sir Thomas Browne to learn to write his ponderous Latin style as Dr. Johnson did, pregnant though it be with lofty and noble thoughts. We do not even want to learn Addison's, Goldsmith's, De Quincey's, J. A. Symonds', nor Froude's style; but merely to learn the art of writing English, and to find out the methods by which these great writers were able to produce their effects, for, as Pope says:—

"Smoothness in writing flows from art, not chance,
As those move easiest who have learnt to dance."

The language we want to use is the best language of the day, and the style we want is our own. And so it is with our architecture; we want for the ordinary buildings of life to give them an agreeable colloquial style, capable, however, of expressing the emotions that should be shown if we have wit enough to use the style properly. We may want to express a look of dignity, stateliness, or grace; or we may only want to express mere homeliness, cheerfulness, or comfort.

For important buildings that are devoted to some high ideal purpose, we want a dignified, or, if we can produce it, a sublime style. There are examples of such buildings in Greece, in the old Roman dominions, and in the Renaissance buildings of Italy, but their main structural forms are now absurd. We neither want an imitation of wooden construction, nor porticoes as a protection from the sun, nor useless attached columns, making the building look like a temple walled up between the columns. Classic columns are often beautiful enough as an æsthetic treatment of a member to support weight, but they are by no means beautiful enough to be used as ornament when they are not wanted structurally, like the pots and pans the Pisans took at Majorca and Minorca, and put on to the outside of their buildings; nor are they suggestive, like the fetters with which the church at Toledo is draped. Some of the Italian palaces are not disfigured with useless columns, but the windows are little peripheral temples—pediments and all—with the middle columns knocked out for light. This was, of course, merely an enlargement of a Roman invention, that can be seen at Pompeii and at Nismes.

Viollet-le-Duc wrote a humorous description of the advance of architecture: he said: "All architects were unanimous in their opinion that the art ought to advance, but there their efforts ended. It was like a scene at the opera, where a band of soldiers sang for a quarter of an hour, 'Let us march,' but at the fall of the curtain they were in the same place as when it rose."

If architecture never had moved, we might give it up in despair, and content ourselves with paraphrases, but there was a great æsthetic advance from the Stonehenge construction to a Greek temple. There was a great constructive advance from the Greek temple to the Pantheon and the Baths of Caracalla, and from these to the dome of Sta. Sophia, carried on pendentives; and from this, again, to the Cathedrals of Amiens, Rheims, or Beauvais: not to speak of the new emotional effects produced, and the attempt to make cathedrals into microcosms in which all the aspirations of mankind were symbolically represented, and were shown to culminate in Heaven.

We can hardly believe that Christendom has been struck with imbecility in this direction only. Even if we think that the aspirations of mankind are now of the grovelling order, we must also think that there must be something wrong in the method pursued in architecture. We know that metaphysics, the old philosophy, is much where it was three thousand years ago, while natural philosophy, being pursued by the inductive method, has, since the fifteenth century, not only found out the system of our universe, but has given man steam and electricity as his supernatural servants. To speak of what steam can do, in one direction only when linked to machinery, it is said that the calico manufacturers of England could, in a year, weave a night-gown for our globe. We may well ask ourselves what can be the reason of this deadness of soul to the highest forms of art. We know that in this triumph of mechanical invention we are surrounded by ugliness, and at present probably necessary ugliness, and that all mechanical perfection seems to run in that way. We might use modern musical instruments as a standard, and say of anything, it was as ugly as a modern musical instrument, for the last new flute

is like a crank-board of a system of bells. We can generally say the same of the structures of the modern military and civil engineers; fortifications are like molchills, bridges are colossal chests, coffins, or the hollow spits for little birds, or a row of pterodactyls strung through the outstretched wings; only we must not speak ill of the bridge that carries us; but we can hardly make the same excuse for the meanness of our own clothes, and for the shape of everything that is in daily use. Our carriage of all kinds, short of heavy waggons and drays, are the perfection of meanness. I am afraid that Liszt's reason is the true cause. He says, the constant and close pursuit of gain is more demoralising to human beings than a little thieving, and illustrates it by the passion for music possessed by the gypsies of Hungary and Bohemia, who are not altogether free from that peccadillo. It is the possession of noble ambitions or lofty aspirations that not only distinguish great men from the herd, but distinguish epochs, and not their freedom from weakness or vice. At times when high aspirations prevail, or just after such times, the fine arts flourish; when they languish, the fine arts decline. It can hardly be said that there is any noble ambition or high aspiration that animates society as a whole just now, though doubtless there are individual ambitions and aspirations as high as ever existed among us, particularly on the lines of benevolence and science. If one may judge of one's own time, it seems that its ideal is the land of Cocagne, where the little pigs run about ready roasted asking people to eat them.

I think that Horace's paraphrase of Tyrtæus' hymn—

"For our own native land to die
Is glorious and sweet;"

contains a nobler aspiration than that of—

"Eight hours' work and eight hours' play,
Eight hours' sleep and eight shillings a day."

Nothing prevents the individual from having noble ambitions and high aspirations, and I do not see why the architects may not cherish them; to be poor and disregarded is perhaps a good soil for the virtues to grow in; most of the Greek philosophers were in this plight, but, as the Italian country ballad says, "Poverty is no bar to nobility of soul." No one can do more than learn, strive, and suffer, and if there are no great buildings to be raised to high ideals, each architect can aim at giving the highest proper expression to the building he may have to design, however humble it may be, and he can devote himself to trying to put life into architecture again.

As the poets study the art of poetry from the earliest to the latest poems, so must the architects learn the æsthetics of their art from every source.

The first and most important point is this, whether it be in the plan, the construction, or the æsthetics, to avoid foolishness; there is very little folly in Greek work or in Early Gothic—both people were too logical; but there is plenty in Roman work. The Romans were born constructors, and were not likely to overlook the usefulness of the arch, nor the saving of cost it effected, but they were not blessed with the artistic instinct; still they felt that the Greeks possessed it, and much of the Roman work looks as if it might have been built by an engineer, and then turned over to the art-architect or decorator, who proceeded to overlay the real construction with a bad paraphrase of Greek work. The Renaissance architects avowedly copied Roman architecture as far as they could, but being naturally artistic, and being mostly painters or sculptors, they made their paraphrases more elegant than the Roman model, even if they lost some dignity in the process.

The next is never to leave out what is wanted, because you do not know how to treat it becomingly; and the third is, never to do anything to make people stare, whether this be in the plan, the construction, or the æsthetics, for besides being a poor device—it first abstracts the attention from the merits of the work, and then distracts the mind from it; as the mind employs itself in trying to solve the mechanical trick. The great object in all æsthetic work is to make the whole look simple, natural, and inevitable. A building so endowed, induces a calmness of mind in the beholder, and entices him to investigate the work more closely, and may eventually lead him to admiration and a higher kind of wonder.

In a mansion I once went over, I went down a staircase to the housekeeper's room and stores, but to get to the rest of the basement I had to go up another to the ground floor, and then down

* La povertà non guasta gentilezza.

again to get into the rest of the basement by another staircase: this was very striking, as the house was only just built, but I doubt if it was convenient. Some public buildings are like the labyrinth at Crete, you want a clue to find your way out. Structural devices to arrest attention are too well known to require mentioning, such as columns tied into knots, twisted together, cork-screwed, or knock-kneed; Bernini's cork-screw columns in the baldachino of St. Peter's are simply ugly; parts held up by suspension that should go to the ground, and even a heavy-looking superstructure supported on that which looks too slight, like the lace-work of the Ducal Palace at Venice, with a nearly dead wall over it, or even the Ca d'Oro; and the same is the case where the upper part of a building is supported by what looks like insufficient corbelling. It is a fundamental axiom that every building should look amply secure; and all such devices to catch the eye are not much better than that one of Wilans de Honcourt, of making the wooden or brazen eagle of a lectern turn its head to the Ambro when the Gospels were read. It might have been looked on as a miracle by the rustics of those days, but the trick was a simple one, the officiating priest put his foot on a treadle.

The two great objects to aim at are breadth and simplicity. I admit that breadth is mostly unattainable in façades in England, and certainly is entirely so in all but a few favoured sites in London, for the whole front is mostly wanted to be of glass, when the width is restricted, to sufficiently light the rooms; but we can all aim at simplicity. If this statement had never been made before, we should all say, "What can be easier?" but it was a past master in the art to succeed, and everyone who has tried simplicity in his designs must have found out the almost insuperable difficulty of getting it, and has mostly been driven by his own incapacity to be much more complex than he wanted to be; for it is not plainness but artistic simplicity that is wanted. The dead wall with a hole in it which came right by chance, I mentioned before; to succeed by trial in making an equally perfect harmony where the size and proportions of the dead-wall are different, would take ten times as long as to cover the whole side with elaborate forms. I may also mention in the case referred to, that something more is mostly wanted to give a more human aspect to the composition—a cornice and a moulding round the window for example, or what not. Perfect æsthetic simplicity looks, too, so easy, so natural, so inevitable, until you try to get it; and then you find that in the examples you remember that "The great art has been to hide the art." I think every architect, when he first looked at a Doric temple, or even at a close paraphrase on a clear day in sunshiny weather, has said to himself, if those Greeks had not lived before me I should certainly have done this very thing and been famous for ever.

Arago said of Newton that he was not only the greatest but the luckiest of all philosophers, for the laws of the universe could only be found out once; but had the law of gravity been found out before Newton's time we may be sure that that sublime mind with that perfect training, would have discovered some law that was next in importance; so though we may give the credit of luck to the inventor of the Doric temple, we may be sure that he would have done something fine had he practised after its invention. Do not, then, console yourselves with the thought that elegant simplicity was exhausted by the Greek temple, but see if you cannot train yourselves to rival it with the buildings you have to do to-day. We do not want Greek temples here; they are as unfitted to our wants as the shapes of the mouldings are to our light and atmosphere, and yet simple shapes and simple mouldings that would tell their tale in England are probably infinite, but, as yet, no one has solved the problem. We never tire of simplicity, and as Count Camarò, the long lived devotee of spare diet, said, "I more enjoy the flavour of my little bit of bread than the other guests at the banquet do the most exquisite dishes." We have all heard of the disgust of the man fed entirely on eel pie. His final exclamation "What, always eel pie?" has become proverbial.

Every orator will tell you that it is much easier to rival Cicero than Demosthenes; for what is true in architecture is also true in speaking. Swift says of simplicity, "Without which no human performance can arrive to any great perfection." Those who aim high cannot do better than take to heart Horace's advice to the Roman poets to study Greek models day and night: he probably followed his own advice, and

his works have lived some 1900 years, and besides learning style, his Greek models were probably of use to him. Much of his poetry is said to be paraphrased from the Greek; "Dulce et decorum est pro patria mori" certainly was from Tyrtaeus. To English architects Greek architecture can be of no practical use. Greek buildings are neither suited to our climate nor our habits, and all their lovely forms and exquisite mouldings are for the bulk of the year the dullest and least effective possible. The Athenian public was the only one we know who had a perfectly refined and cultivated taste, though the Florentine was the nearest approach to such a public in modern times.

Uneducated tastes mostly look for outward signs of labour and display. If any architect could now build like Ictinus or Mnesicles he would probably have the fewest admirers of any architect, still those few would be worth all the rest. Nothing can be so good for the English architect to study as Greek work; he will learn some of the secrets of its success, some of its grand style, and he may be able to make his architecture as pure and simple as that of Athens, though absolutely and entirely different. Soane, Wilkins, Cockerell, and Gandy were the great students of Greek architecture of their day, and there is a dignity and charm about their works that is scarcely found elsewhere. A philosopher said "All the reward that all the workers at the Pyramids got, was the admiration that they excite and have excited," and every architect should think that if he has done a bit of good work, somebody has probably seen it, or will see it, to whom it will give delight, and who will say, "The man who did this was an artist." It may even be that some fragment may be preserved, and be like a scrap of poetry that has become one of those

"jewels five words long
That on the outstretch'd finger of Old Time
Sparkle for ever."

Casts of those crumbling pilaster caps of the Erechtheum are precious things, even in a drawing-room adorned with the finest works of the modern painter, sculptor, and statuary; they tell out with a purity, a dignity, and a style that makes us treat them with the respect we should treat one of the old heroes or poets who came from the Elysian fields.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS: SIMPLICITY IN ARCHITECTURE.

AN ordinary meeting of the Royal Institute of British Architects took place on Monday last, at 9, Conduit-street, Mr. F. C. Penrose, M.A. (President), in the chair.

Mr. W. H. White (Secretary) read a list of candidates recommended as Associates.

The Secretary also read the by-law with reference to the nomination by the Council of the Royal Gold Medalist, the day of election being fixed as the 11th prox.

The President then said it was his duty to announce that the Council had elected Mr. James Brooks as the gentleman whose name should be submitted to Her Majesty the Queen as a fit recipient of the Royal Gold Medal for his executed works as an architect.

The President remarked that they were about to hear some papers on the subject of "The Value of Simplicity in Works of Architecture." Some gentlemen who had intended to come that evening were unable to be present, and he had received the following telegram:—"Sorry cannot come, but can't. Count me against architectural confectionery and fidgety façades."—WALTER CRANE.

Mr. Halsey R. Ricardo said that, in the words of Mr. Ruskin, "Architecture is the art which so disposes and adorns the edifices raised by man, for whatsoever uses, that the sight of them may contribute to his mental health, power, and pleasure." He stated that "all architecture proposes an effect on the human mind, not merely a service to the human frame." And we knew that these words were true. This effect might be the expression of the individuality of the architect, or the owner of the building, or a fusion of their associated individualities. Mainly it was the architect who spoke through his work; the building-owner set him the conditions, but their resolution was his occupation. In architecture, man's individuality was swiftly discernible. Let not a man think to conceal his id-nitv: a

* Hor., Lib. 3, Ode 213, "For our dear native land to die is glorious and sweet,"—Sir Theodore Martin's translation.

moulding betrayed him; the preparation for a cornice or the stopping of a string-course proclaimed him. Living architecture was that which answered the requirements of the day. The requirements might be modest and sensible, and then the architecture would be beautiful and strong; they might be affected and individual, and then the architecture would be so far paralysed; they might be extravagant and vulgar, and the architecture would be violent and vulgar in response. Early in the century we threw the weight of 300 years, and masquerading Perpendicular Goths, went about our business of the day. Then some very superior people shook off a couple more centuries, and attempted to play at being knights out of armour. Time, the policeman, moved us on, and we proceeded to play just round the corner. The 150 years or so seemed a bridgible difference, and Christopher Wren a good serviceable stock on which we could graft what of Italian, Dutch, German, or other, we might choose. And at this point we were now arrived. The whole past was a vast treasury for us to draw upon. But this wide range of choice had been attained with the loss of tradition. And this want of traditional support had had the result of clogging and obscuring the architect's mind with detail. The traditional methods had been obliterated; but there was a strong tendency to adopt the opinion that detail would pull one through, even if one could not get the masses right. A short while ago the Terrace in High-street, Kensington, came into the hands of the builder. The buildings, low and out of date, stood back from the road, and their reticence did something to counteract the unpleasant constricted feeling that one had in the High-street. The houses were pulled down, and a large block erected on the advanced frontage. The ground floor built in the "practical" style—brick party-walls, some steel knitting needles, and some sheets of plate-glass above this, four stories of domestic architecture in the style of "the man in the street." The building was curiously illustrative of the temper of the day. It was devoid of proportion, and covered with knick-knacks and the general frippery of architectural ornamentation. Across the road, and forming its north side, were two blocks of buildings, called Lower Phillimore place. They were not conspicuous examples of good proportion, but they were simple, quiet, and refined. They looked with scorn at the blazing vulgarity of the new-comer opposite. Seventy years ago we should have called them builders' houses of a good type; to-day we called them dull. Buildings, like the drama, should be pregnant—condensed—in their ornamentation. Simplicity in architecture meant good art in architecture, and good art in architecture meant perfect adaptation to the circumstances surrounding it. Good art was therefore pre-eminently practical. All this welter of indiscriminate ornament was not practical.

Mr. Basil Champneys said he had been asked to speak on the subject of Simplicity in the Art of Architecture, specially with reference to churches and country houses; though the principle of simplicity was really universally applicable to all architectural art whatever. There were two positions which it was desirable that we should establish in the first instance: the one that simplicity was a note of the highest art everywhere and in all its branches; and the other, that it was specially characteristic of the English genius. In the fourteenth century, when foreign art was developing into the vagaries of the Flamboyant in France and the neighbouring countries, and in Germany into a variety of ingenious extravagancies, in England the invention of the perpendicular held eccentricity in check and resulted in work which erred as often on the side of severity as of exuberance. A work such as the Chapel of King's College, Cambridge, with all its elaboration and extreme development of constructional art in its vaulting, was still essentially one of the simplest, as it was one of the grandest of Medieval buildings. If such a work as Henry VIII.'s chapel be quoted against him, he should answer that, beautiful as it was, it showed the note of decadence, and was evidence only of the exuberance into which art might run when the restraint of a wholesome traditional principle was removed. But, putting aside these more conspicuous examples, one could appeal with even greater confidence to the vernacular examples of ecclesiastical art, to the dignified modesty of thousands of village churches of no special fame, all of which, almost without exception, showed unobtrusively some note of true inventiveness and some degree of poetic charm. An idea was unfortunately prevalent that simplicity in art was

usually to be found in an inverse ratio to inventiveness. He believed that the exact opposite was true, and that if necessity was the mother of invention, simplicity was daughter of inventiveness. From first to last the law held good, that every building, to be a work of art, must originate in one central idea—what the French called the "*idée mère*," that to this idea all that the inventive powers might evolve must be strictly subordinated, and that it was better to apparently fail in inventiveness than actually to fail in unity and keeping. The popular demand for so-called originality was perhaps the most dangerous influence against which the art of the time had to struggle; nor was it more noxious than absolutely unreasonable. True inventiveness was always unconscious; nor could anyone by taking thought increase his originality one whit more than he could add a cubit to his stature. No art had ever progressed by jerks; healthy progress had always been smooth, gradual, and tentatively modest; and this was especially true of architecture, which could never be largely divorced from precedent, and relied so largely for its effect on associated ideas. Style had been defined by someone as "having plenty to say." It would be more correct to say that one of the essential conditions for writing a good style was to have plenty of material; perhaps another condition might be not to try to say too much. These remarks had a very direct application to the question of architectural simplicity. Architecture, of all the arts, was the most firmly based on the practical. In the design of every building the primary problem was to fulfil certain definite practical requirements according to established constructional laws, and it was on the spirit in which such problems were met that style in architecture mainly depended. If they were met honestly and simply, the thing to be done being held primarily in view and sound laws of construction loyally obeyed, at least the conditions of good architecture were present. In architecture, unity and simplicity were so closely allied as to be almost interchangeable terms. But the only condition on which true and complete unity in architecture could be obtained was that the design shall have been originally conceived as one complete whole. One often came upon proposals which seemed to imply that a design might be taken to pieces, and that the elevation was to follow a plan previously and independently made. This was a dangerous heresy. A plan was a good plan if, fulfilling the primary practical requirements of the scheme, it involved by legitimate construction a building both internally and externally good. Unity of effect involved and implied unity of conception.

Mr. Francis C. Penrose, in a short paper on the same subject (read by Mr. Carie) said that in an age of such varied and complicated wants as the present, the primitive simplicity of our Norman and Saxon ancestors could not be maintained, nor would it be, to that extent, desirable. Every historic style of architecture had passed through the phases of its first unadorned dawn, then its meridian excellence, and thence has sunk to a more or less complete state of decadence. There had been a rude but grand kind of simplicity in the first period; then the well-ordered and chastened simplicity of the culminating stage, and invariably a loss of this quality at the close. But, nevertheless, in England at least, a resolute stand was in some very important instances made against the prevailing tendency to complication. Witness the works of William of Wykeham, in Winchester Cathedral and elsewhere, and of the architect, whoever he was, who built King's College Chapel. A noble stand was also made against the degeneracy of the Renaissance in England by Inigo Jones and Sir Christopher Wren, and in France by Claude Perrault in the Eastern front of the Louvre. Besides these examples of stemming the adverse current, we had encouragement derived from the sequence of the works of nature. Consider the gradation which we found between the pendant violet and cowlsp of spring, the severe con-centric majesty of the summer rose, and the radiating flowers of autumn; but none of these, with all their variation of character, could we charge with want of simplicity. The examples and analogy above given ought to encourage us to feel assured that even though a tendency adverse to simplicity had become prevalent, it was quite capable of being corrected. Let us, therefore, endeavour to establish the means by which it might be done. A prime essential was the rule that no particle of ornament, whether decoration be abundant or scanty, should be used without a definite aim. Let us next consider the advantage of a well-ordered and simple plan. One of the greatest

charms in viewing a building arose from the exercise of the mind, when the orthographic aspect was distorted by perspective, in recovering the true shape or plan from the image presented to the eye. In a well-balanced architectural composition, this process could be gone through satisfactorily before the mind was fatigued by it. As to the quality of simplicity in the orthographic aspect, the first principle should be the expression of one central idea connected with the purpose of the building; and any subordinate compositions should have reference to the main idea, and by far the larger part of the ornamentation used should be grouped in connexion with it. It might be instructive to point out how very little some of the finest works of architecture owed to complexity of structure and ornament. In the Propylæa there was no ornamental carving whatever. Our two noblest cathedral fronts, Lincoln and Peterborough, owed their imposing and beautiful effect to simple forms. The Sainte Chapelle looked far more impressive when he first saw it, with the windows and floor quite plain, than after its modern elaboration with paint, gilding, and tiles. Taking for granted the desire to work out a design in due simplicity, the method which had occurred to him was something of the following nature. Having well thought out the capabilities of the plan, commence the elevation on quite a small scale—such, for instance, as the object would appear at a distance equal to ten or twelve times the height. On so small a scale none but the principal features would be distinct. Sketch these into shape before any enlargement of scale was thought of. Then adopt scales representing the building at nearer distances by steps, until the scale was sufficiently large to exhibit roughly all the detail that might seem desirable. When this had been discussed and got into shape it would be desirable to leave the elevation alone for such interval as might be wanted to attend to some other of the requirements of the building, and then, with a fresh eye, return to the elevations and compare the last enlarged sketching with the first small scale drafts, and carefully consider whether in the subsequent elaboration the design had at all lost its primitive simplicity, and, if so, cut out all excrescences which might have caused such departure. There was ample room for true originality by the exercise of the restraint and the condensation of thought referred to above, and ample scope for its exhibition by skilful planning and grouping, so that its merit might at once be evident to any thoughtful observer when comparing any such work with the florid unmeaning designs, of which we had so many, worthy of the speculative builder, and lead him to say, "This seems to be the work of an architect."

Mr. H. H. Statham proposed a vote of thanks to the President, and to the other two gentlemen, who, they were all sorry to feel, were not members of the Institute, but who had contributed such excellent and thoughtful papers upon a subject, the consideration of which was certainly very much called for at present. Having regard to the great majority of the buildings which were hurried on in the present day, they were characterised by an exuberance of ill-thought-out ornament, which he was afraid was to some extent due to the increasing prevalence of the system of competition, which almost invariably led to a desire to produce a design that should attract attention before anything else. At the same time, it was of no particular use that he, who opened the discussion, should agree with everything that had been said. He thought there were points where more was meant than met the ear, and he should like to suggest another side to the question. He believed that the more thoughtful minority of the architects, or some of them, had been perhaps driven to the opposite extreme from florid architecture, and were rather in danger of drifting into what might be termed an affectation of simplicity. Before bringing forward one particular instance of this, he would ask, in the first place, were the critics altogether consistent themselves? They were wont to consider thoroughfares like the old Georgian streets as dull, but they were now told that it was stupid to have such an opinion. Mr. Ricardo had mentioned an instance in Lower Phillimore-place, where there was much more sensible architecture on one side than in the new buildings opposite. He knew an old Georgian street in which were red-brick houses with no ornament of any kind, but with a cement string carried from one end to the other. An architect came and made a new front to one of these houses, putting in gables at the top, and a very big window with plaster deco-

ration over it. He was so anxious to obtain curves that he put a bow-window in the ground story by tucking the bow back to the inside of the walls. That was on the south side of Great George-street, and the architect was his friend Mr. Ricardo. He (the speaker) was not shocked at that in the least; on the contrary, every time he passed it "contributed to his mental health, power, and pleasure." It was putting something very interesting and picturesque into that which he maintained was a very dull street. At the same time he did not see how Mr. Ricardo's practice squared with his preaching. To come to the other point, as to the affectation of simplicity, he was talking one day to a friend who was one of the "simple-minded" architects. This gentleman was complaining of the vulgarity of modern architecture, and like Vivien, in the "*Idylls of the King*,"

"Let his tongue
Rage like a fire among the noblest names."

At last he pulled him up, and asked whose architecture he did admire, and then he mentioned one person whom he would style X. Y.—a man whose name many there had scarcely heard of. He had discovered, however, that to admire a building of X. Y.'s was one of the proofs of being among the truly elect. Not having seen any of this gentleman's buildings, he asked his friend where one could be seen. The answer was, "Go and look at a small house in a certain square." He went there, and found a small semi-detached house of excellent brickwork. It was always refreshing to see excellent brickwork, but there was not one feature, one moulding, or any of what were usually called architectural features from top to bottom of the front, except a half-projecting course of bricks to make the semblance of a string. It was, of course, very easy on these terms to avoid bad taste; but instead of simplicity in architecture, it was rather simplicity without architecture. He found among the examples on the walls a drawing of Newgate, and it was a curious indication of the rate at which things had gone that about ten years ago, when giving a lecture to a general audience, and instancing Newgate as an example of expression in architecture, a row of young architectural students at the top of the room began to laugh. To them he replied, "Dance was told to design a gaol, and he made the building as like a gaol as possible." He was right, but surely it was only in that respect that Newgate could be admired as a simple building. They were surely not going to have Newgate held up to them because its simplicity of architecture was an example worth imitating in every building; as a gaol design it was admirable because it was so forbidding. Let them consider in a few words what simplicity in architecture really meant. They had had it hinted most truly by Mr. Champneys—with whom he agreed—that unity and simplicity were so closely allied as to be almost interchangeable terms. If they came to think what that led to they would see that it would allow for a very large amount of elaboration. It was a dictum of Sir Charles Barry, who was the greatest English architect since Wren's time, that he did not object to any amount of richness in a building, provided it was consistently carried out. They might take two views of simplicity; in the first place, with regard to the general design of a building, and secondly, with regard to detail. With regard to general design, it should be well balanced, and in an important building symmetrical, and not cut up simply for the sake of producing what were called picturesque sky-lines. In the case of detail, what was required was to have the detail thoughtfully and well designed, and proper to its place. Surely that was one reason for preferring what was termed simplicity, because the designing of thoroughly good ornamental detail was a difficult thing, requiring much thought. It was one of the curses of the present day that there was a quantity of bad and thoughtless ornament put on simply because a man wanted to put something to attract attention, and did not know what else to put. But if they came to the case of a building where there had been time and will to give thought to the composition of the ornament they might go to any amount of richness and still have simplicity. The Taj Mahal, for instance, might be called, on Mr. Champneys' principle, a simple building, possessing what he had termed the *idée mère*—everything being subordinated to the original idea. He would not say that Henry VII.'s Chapel was not simple. He had a French friend who came over a year or two ago for the purpose of studying architecture in London and who said that nothing he had seen here had struck him as being so beautiful as the interior

of Henry VII.'s Chapel. That was a sort of indication that it had a power over men, and its richness was consistent, because, though it was the very excess of elaboration, it might be claimed as one of the buildings which, in its general idea, was connected logically, and therefore simple, and only elaborated in proper subordination to the general features. He would like particularly to thank the President for the most suggestive remark he had made on the mode of designing a building—viz., studying it in block on a small scale first, and then studying the details on a larger scale. He thought that young architects who were present would do well to lay that advice to heart. It was a most useful suggestion, and one which was not sufficiently kept before the minds of people in designing.

Mr. Alma Tadema, in seconding the vote of thanks, said that a work of art should look like one construction. The great secret of Greek architecture seemed to be that their ornaments were only lines. It was true that a building like Henry VII.'s Chapel was beautiful, and that its ornaments did not exactly destroy the simplicity of its proportions, but still it reminded him a little of the Maori, who still remained a beautiful man, although he was tattooed. Unity and simplicity ought to be beautiful. He had always considered the plan, the section and the elevation as being the Three Graces of architecture, which could not be separated. In London, the pity was that architects had not fair play on account of the climate, or want of climate. He would conclude by saying that though simplicity was one of the great laws of art, poverty was not art.

A communication was read from Mr. Ince, in which he wrote that simplicity was not by itself meritorious, and that it was after all a relative term. If simplicity were meritorious, Gower-street would lay claim to virtue; but what was wanted was to produce a fine effect by simple means.

Mr. H. W. Primrose said he was reminded of the old phrase "ars est celare artem," when they were discussing the question of simplicity. Artlessness was one thing, and simplicity another. The former was at the bottom of the scale, and the latter at the top.

Mr. W. Young thought it was a healthy sign of the Institute that one night had been given up to discuss the subject of simplicity in architecture. The majority of the work of the present day was characterised by a restlessness and disregard of all the old principles on which architecture had been built up, and the great social upheavals now going on were characteristic of the same principle. He thanked Mr. Alma Tadema for the words "simplicity, but no poverty." It seemed that they were in want of a true definition of the word "simplicity," and they ought to arrive at some common understanding of what was meant by it. He had two meanings for it. First, there was a simplicity begotten by indifference or ignorance, or simplicity by faddism out of conceit; and, on the other hand, there was a simplicity, by deep study, out of great skill. The one was the simplicity of Simple Simon; the other the simplicity of wisdom. That simplicity was not one of Ruskin's Seven Lamps, but it was one of the lamps known to the old architects, from the time of the ancient Greeks down to the present day. Sometimes the light had burnt dimly, but it had never gone out, and there was no better course than to go back to early principles, and endow their buildings with simplicity. Simplicity should not be confined only to the elevation, but should also extend to the plan. In public buildings of recent years, simplicity of plan had reached a high point. In domestic buildings, again, he looked at the view of one and found it marked by much simplicity, but in studying the plan he found it most intricate. There was a certain amount of moderation desirable in simplicity, as in everything else. It might be that to arrive at true simplicity, condensation was necessary, just as in writing an essay, the man who was not in a hurry would go through it, and by condensing it produce simplicity. It might, however, be carried too far, just as elaboration might. He had looked at buildings which were so simple that the simplicity had become most objectionable. Enthusiasm should be tempered by simplicity, and simplicity by moderation.

Mr. Wm. White, F.S.A., thought that one of the elements in the matter had been lost sight of, viz., that of repose. Proportion was one of the grandest elements in architecture, and good proportion would give repose.

Mr. E. R. Robson thought that the idea desired to be conveyed might be better expressed by the use of the terms "reticence" or "self-restraint." The President remarked that the observations

of the different speakers had been chiefly directed to definition. He was sure that the author of the paper had not meant a blank wall, or anything which did not require the exercise of the faculties of the designer or observer.

The vote of thanks was then put, and carried by acclamation.

Mr. Champneys replied for himself and the authors of the other papers. He felt that they ought to have started by the universally admitted definition of what simplicity was. In fact, he would not mind exchanging the term for reticence or restraint, or a variety of other terms going in the same direction.

The President announced that the next meeting would take place on Monday, the 25th inst., when Mr. T. W. Aldwinckle would read a paper on "Fever Hospitals."

The proceedings then terminated.

MAGAZINES AND REVIEWS.*

THE *Art Journal* publishes the first instalment of an essay on "St. Sophia," by Mr. Richard Davey; critical and historical, with some illustrations. Mr. Wedmore writes on the art of the poster, illustrated chiefly from French examples. The cleverness of most of these examples is a good deal dashed with the kind of vulgarity which in France would be called *chic*. M. Puvion de Chavannes and Albert Moore are the subjects of two short articles; in regard to the former the writer, M. Bernac, draws attention to a certain degree of "new departure" in the style and colouring of the painter's recent works. "Progress in Cotton Printing" is the subject of a practical article by Mr. Lewis F. Day.

The *Studio* contains a long and well illustrated article on the Art of Mr. J. W. Waterhouse, and also the unusual incident of a distinctly architectural article, "An Ideal Suburban House," by an architect, Mr. H. Baillie Scott, in the plan of which the only water-closet on the ground floor opens out of the scullery; a truly delightful arrangement. Is that "ideal"? From an artistic point of view there is much that is good in the suggestions and illustrations, but it is the fault of the artistic architect of the day that he seems to have generally no sense of sanitary and convenient planning.

The *Artist* is such a medley of scraps, many of them interesting, that it is impossible to lay hold of anything special in it, except an article on "The Past, Present, and Future of Colour-Printing," which is the only consecutive piece of writing of any length. The paper contains a number of heterogeneous illustrations, including reproductions from Michelangelo's sketches, which are dotted about the pages, and are always interesting to see. These are from a sketch-book in a private collection.

The *Engineering Magazine* includes an article by Mr. Goodyear on "First Principles in Architecture"—rather late to come back to that now. He thinks "the coming architect is an engineer." The engineer will have much to learn first. There are some good remarks in the article, however, but we rather dread "first principles." They generally mean negation of everything. Mr. Haupt's article on "Planning the Site for a City" is of more interest for America than for England, where we never have the chance of doing such a thing. Would that we had: what a city might be made! Mr. Gardner's article on the "Architecture of Municipal Buildings" is a very good one, rendered more interesting by a number of comparative illustrations, old and new. The *Reliquary and Illustrated Archaeologist* for January (Quarterly) contains a great deal of interesting archaeological information, well and largely illustrated. Among the contents are an article on "Wall Paintings at Kirkby Hall," and a "Survey of the Existing Remains of the Priory Church of Holy Trinity, Micklegate, York."

The *Journal of the Royal Society of Antiquaries of Ireland* includes an article on the "Round Towers in Northern Clare" (the third of a series), by Mr. T. J. Westropp, with some illustrations; and one on the "Origins of Prehistoric Ornament in Ireland," by Mr. George Coffey. To this, which is of some interest, we may return.

In the *National Review* Mr. Beachcroft and Mr. H. P. Harris discuss at considerable length "The Work and Policy of the London County Council," the article being practically a defence of the point

* The object of these notes is to point out anything in the contents of the current magazines which is of special interest to our readers, with occasional brief criticisms on the views expressed in such articles. When a magazine which has been sent to us is not noticed, it is because that number contains nothing that it is within our province to comment upon.

of view of the "Moderates." In regard to the most important point at this moment, the water supply question, they point out that, on the supposition of the County Council carrying out the

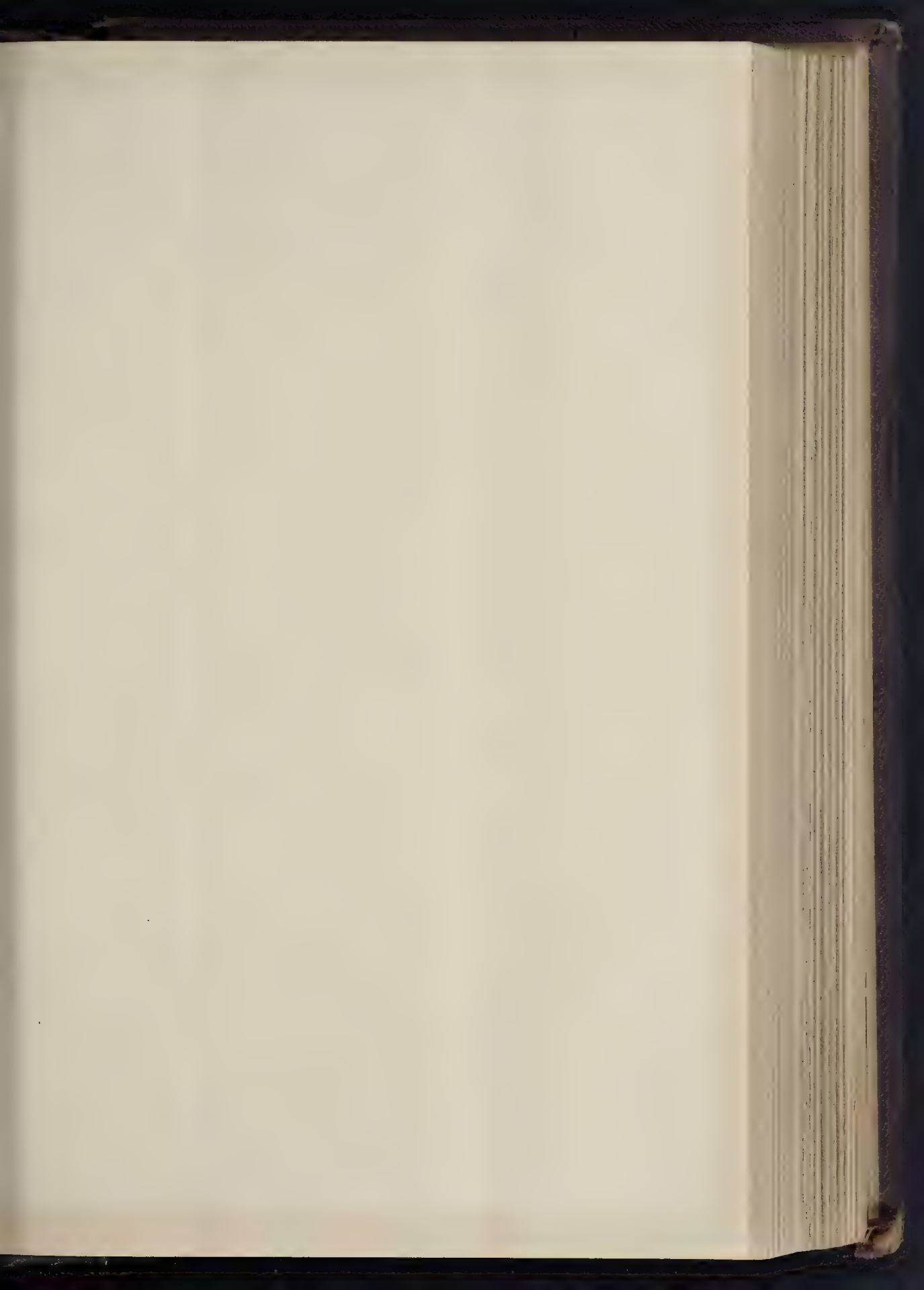
"Progressive" policy of buying up the water companies, we are not told where the purchase-money is to come from, and they calculate that the provision of it will probably mean a permanent additional rate of at least 4d. in the pound. This, as they say, is not a reassuring prospect for ratepayers, who are admonished to endeavour to realise the probable results of this policy on their pockets before they commit themselves to supporting it. The authors, however, fully realise that some new departure in regard to the regulation of London water supply is imperative, and in the alternative of deciding against the County Council as the purveyors of water, they suggest the compulsory amalgamation of the water companies under the management of a Water Trust appointed by Parliament; an alternative certainly worth serious consideration. It is to be regretted that they rather weaken their case and their article by adopting such a tone of confidence in regard to the illusory Report of the Royal Commission on Water Supply; a document which, as we have more than once pointed out, is practically an advocate's *couleur de rose* Report in the interests of the water companies. The same number contains an interesting account by Mrs. St. Loe Strachey, of a visit to Dashur, under the guidance of Mr. de Morgan, the director of the Ghizeh Museum, to see the tombs of the Egyptian princesses of the XIIIth Dynasty, which he has had the good fortune to bring to light.

In *Scribner's Magazine* Mr. Robert Grant's article on "The Art of Living—the Dwelling," is not really concerned very much with "the dwelling" in its concrete sense; but he does diverge to this in the course of the article, to remark that the American architect has been showing what he can do of late years in dwelling-houses, and that "much of it is fine and some deadly; for the display includes not merely the generally tasteful and artistic conceptions of our trained native architects, who have studied in Paris" [nothing else, apparently, counts for "training"], "but the raw notions of all the builders of custom-made houses who, recognising the public desire for striking and original effects, are bent on surpassing one another." The not unnatural results are briefly described in strong but decorous language. "As there is no law which prevents one from building or buying an ugly house, and as the architect suffers no penalty for his crime, our national house architecture may be said to be working out its own salvation at the public expense." Is it not pretty much the same in all modern cities? Mr. W. C. Brownell (the gentleman who, exalting French art at the expense of English, printed a Turner for a Claude among the illustrations to a former article, and refused to acknowledge or correct his blunder) contributes an article on "The Recent Work of Elihu Vedder," an artist in ideal figure subjects of whom more ought to be known on this side of the water, and who is certainly a much finer painter than Mr. Brownell is a critic. The article on American wood engravers is occupied with the work of Gustave Kruell, "a German by birth, but an American by heart," and that pertains to the growth of his art, a view which the illustrations of his work hardly bear out; there is a tendency towards the grotesque in there, which seems to belong to his German descent. A very pleasing portrait of Mr. Hamerton, from the last photograph taken of him, is one of the attractions of a number of very varied interest.

Harper's Magazine includes an article by Mrs. Pennell on "Art in Glasgow," a review of the Glasgow group of painters, which perhaps rather exaggerates their importance as a school (if they are to be so called), though we quite agree with much that is said about the work of some among them as individuals. In the same number Mr. E. L. Weeks has one of his descriptive articles on "Oudepore, the City of the Sunrise," with a number of charming illustrations of street scenes and palaces.

In the *Nineteenth Century* the Hon. Reginald Lister gives an account of the recent work of the French at Delphi, comparing their position and facilities, supported by the liberal subscriptions of their Government, with the discredit manner in which the British School at Athens is left to do what it can on its own slender resources, without the support of the English Government either in sympathy or in funds.

In the *Pall Mall Magazine* Mr. Walter Besant continues his articles on "Westminster," dealing



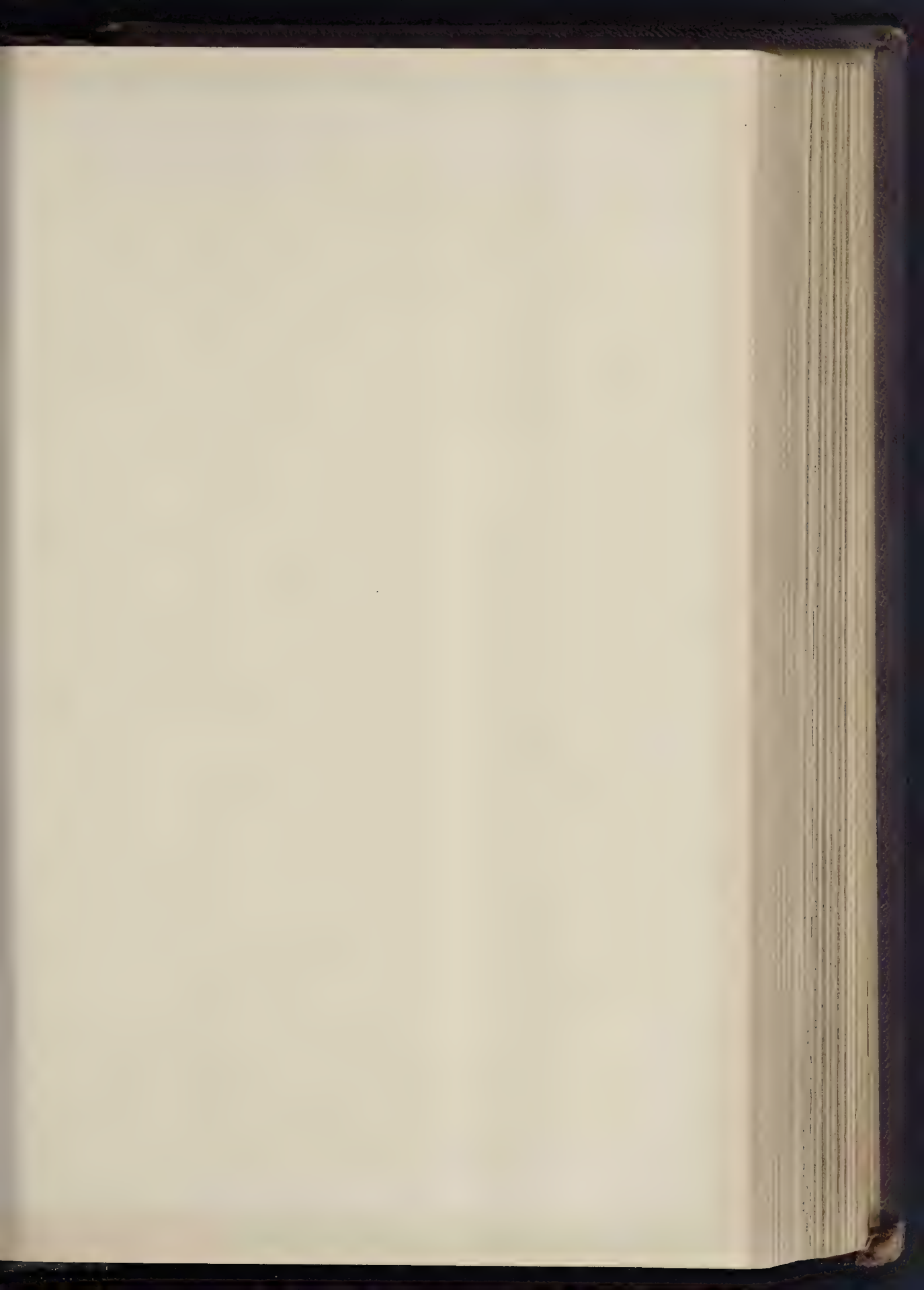


SCHEME FOR THE PARIS
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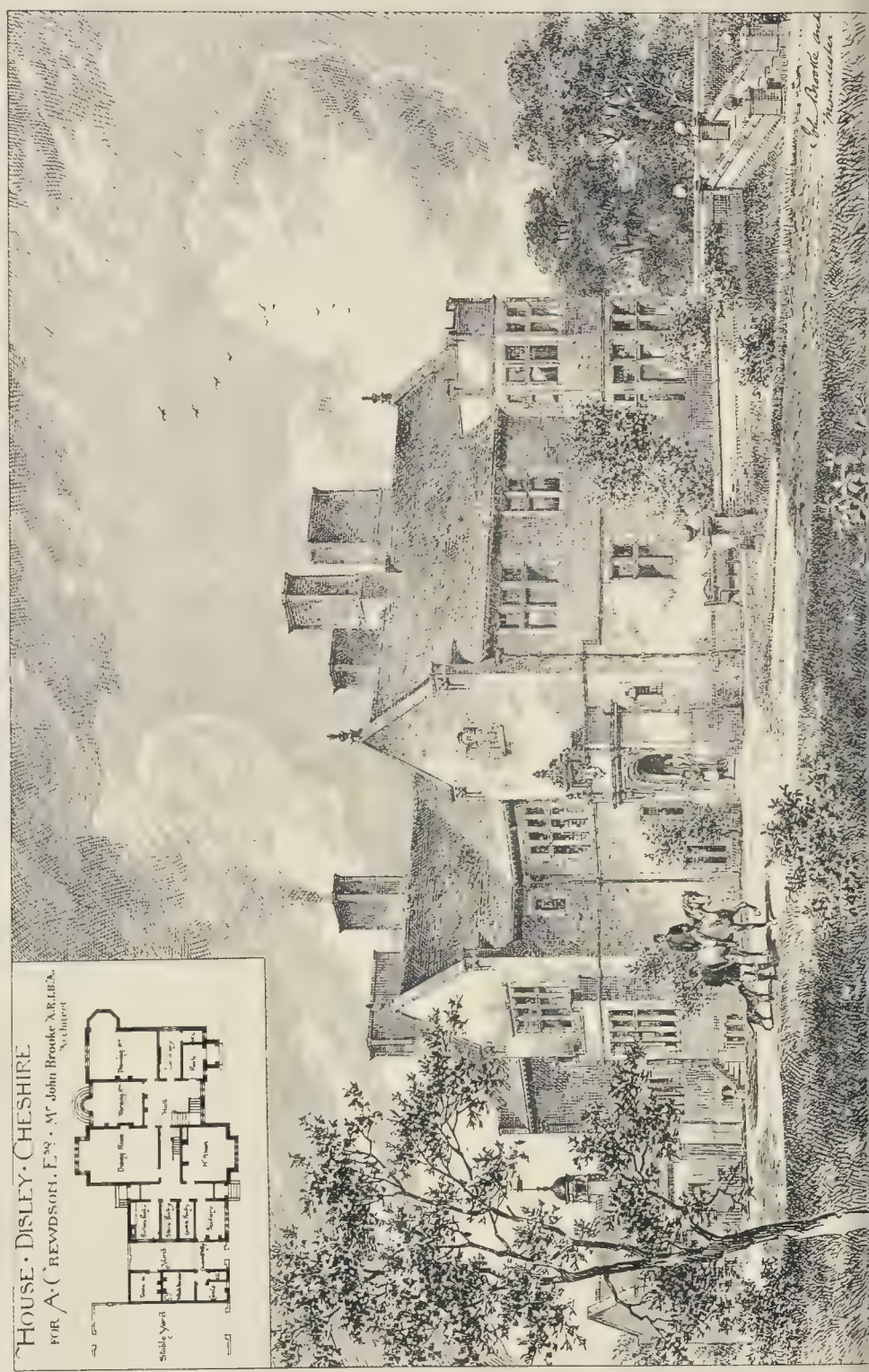
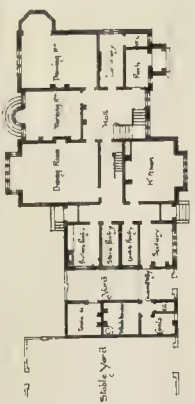
F 1900. -By M. HENARD, ARCHITECT.
 EMATED DESIGNS.

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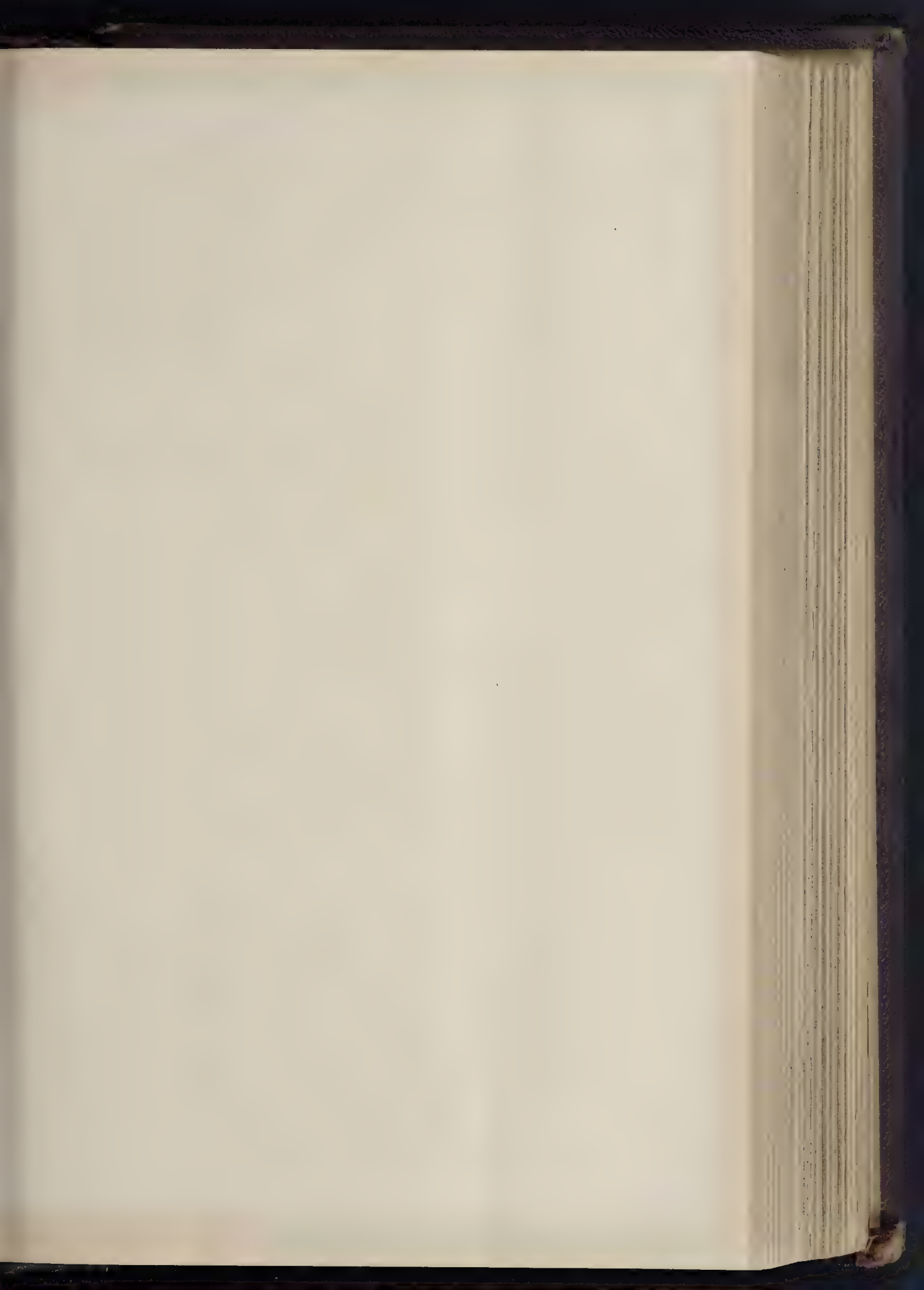


THE BUILDER FEBRUARY 16, 1905

HOUSE, DISLEY, CHESHIRE
FOR A. C. REVDSON, F.R.S., Mr. John Brooke X.P.E.B.A.
Architect

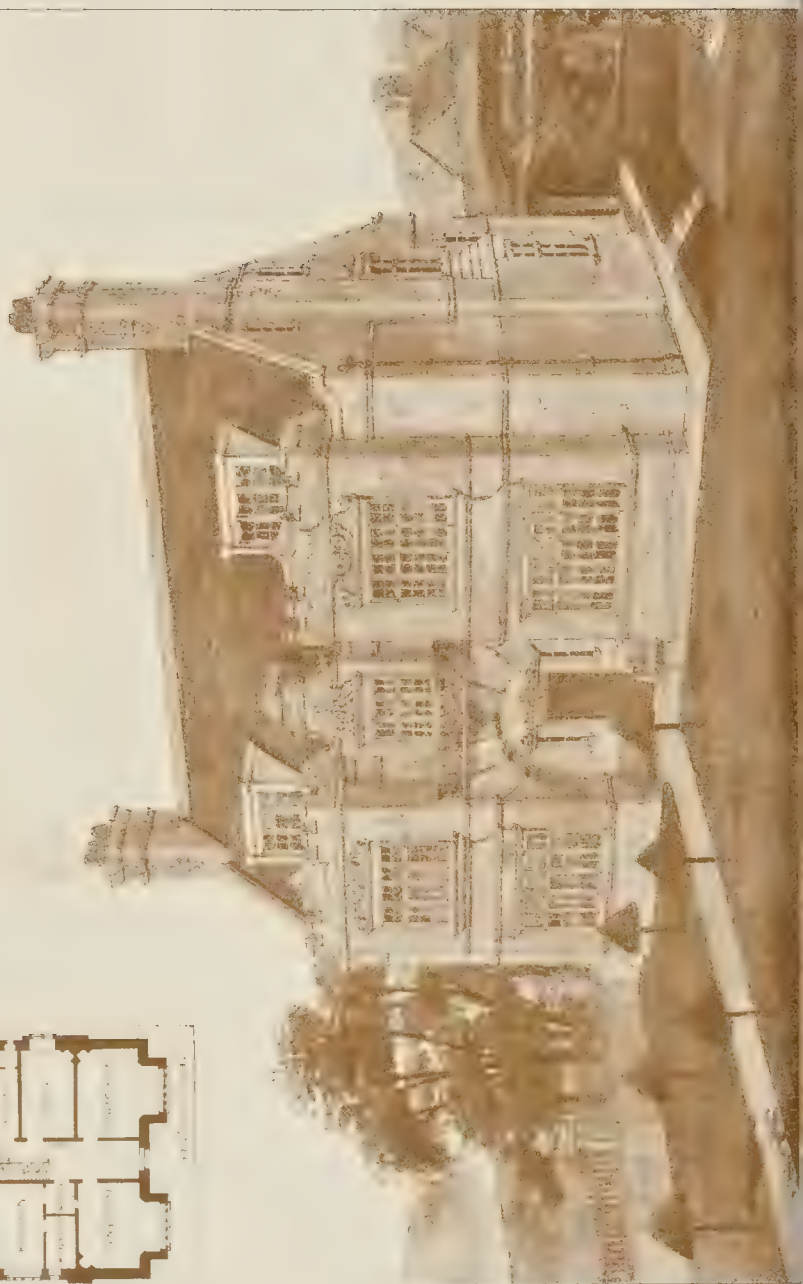


Mr. Brooke and
Mrs. Brooke

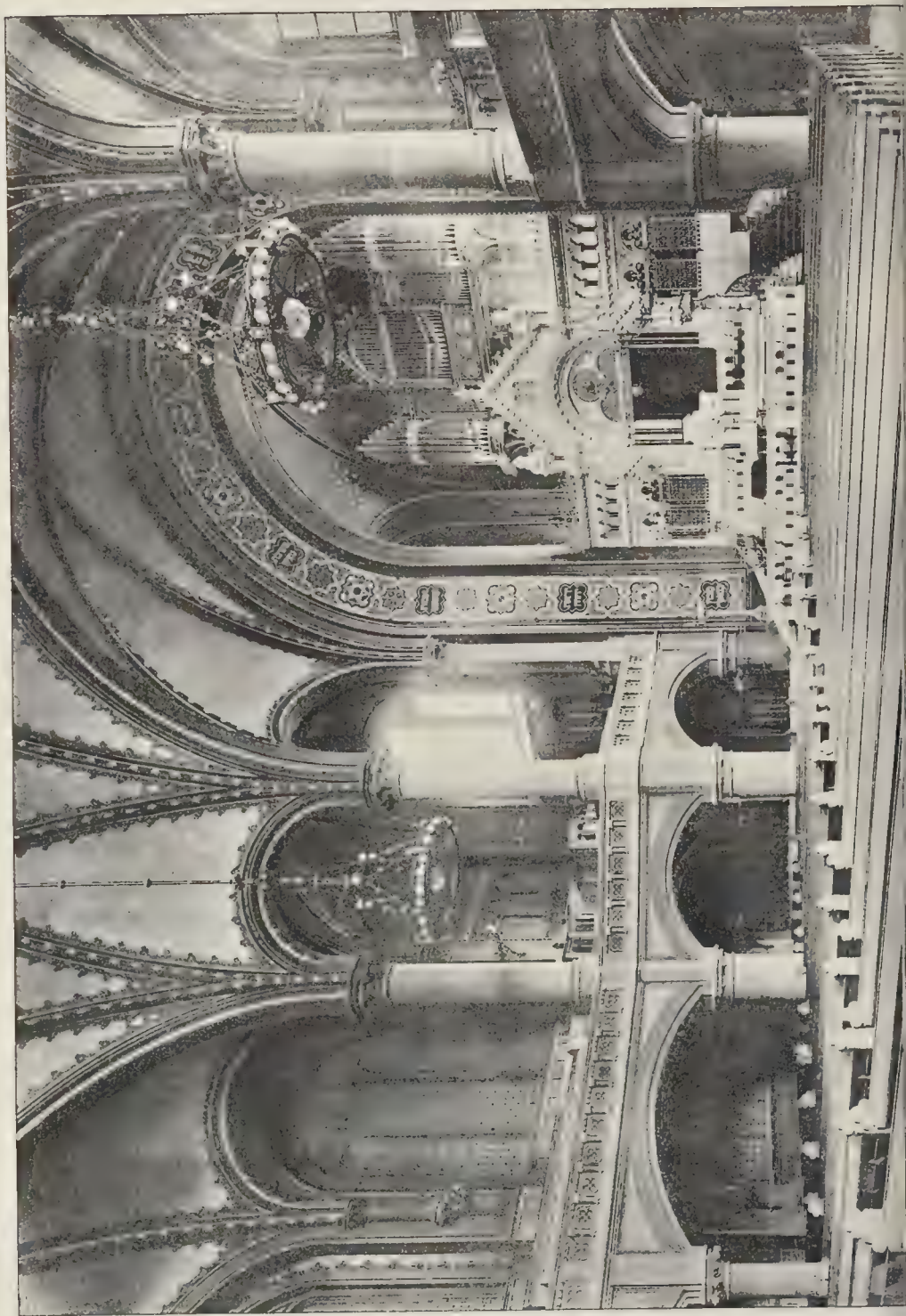


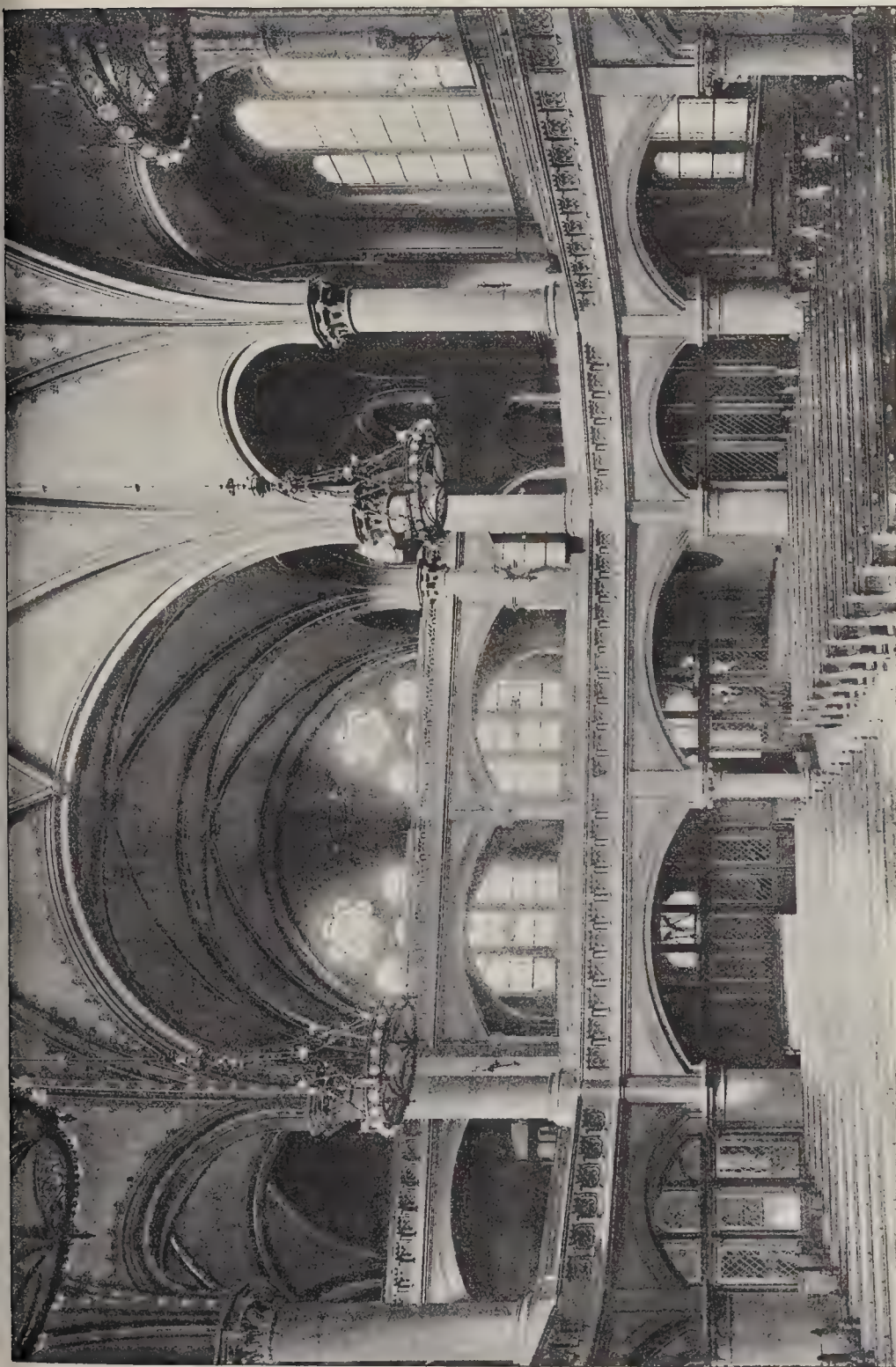
THE BUILDER, FEBRUARY 16, 1895.

A House in: Cleveland:



THE BUILDING, FEBRUARY TO 1895





NEW SYNAGOGUE, BERLIN—MESSRS CRÉMER & WOLFFENSTEIN, ARCHITECTS



NEW DRAWING BY MR. A. E. STREET, ARCHT. & C.

PROPOSED NEW TOWER AND AISLES, DEWSBURY CHURCH, YORKSHIRE.—MR. ARTHUR E. STREET, F.R.I.B.A., ARCHITECT.



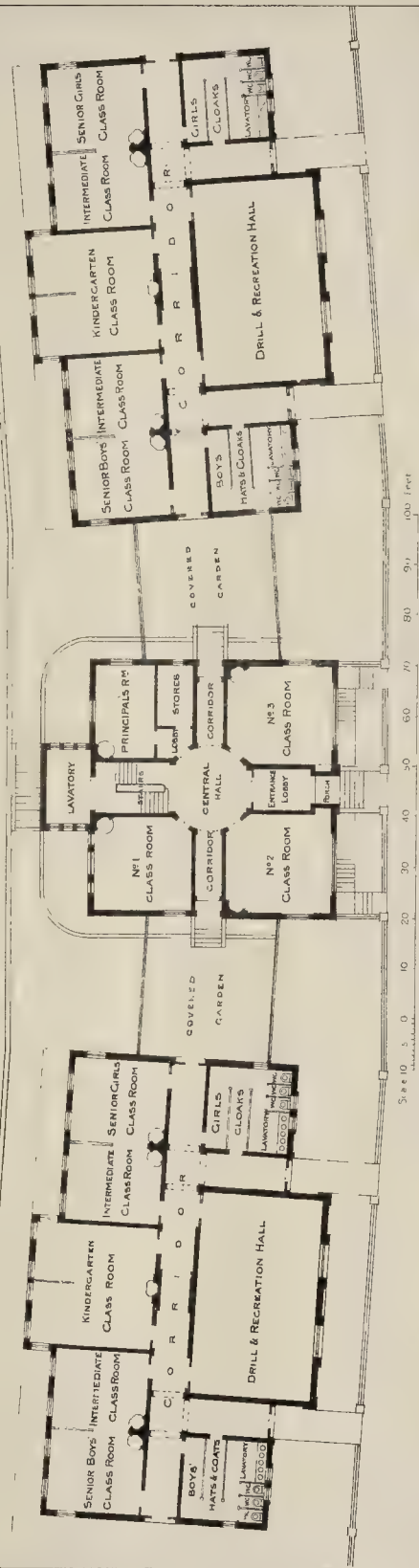
KINDERGARTEN

TRAINING COLLEGE

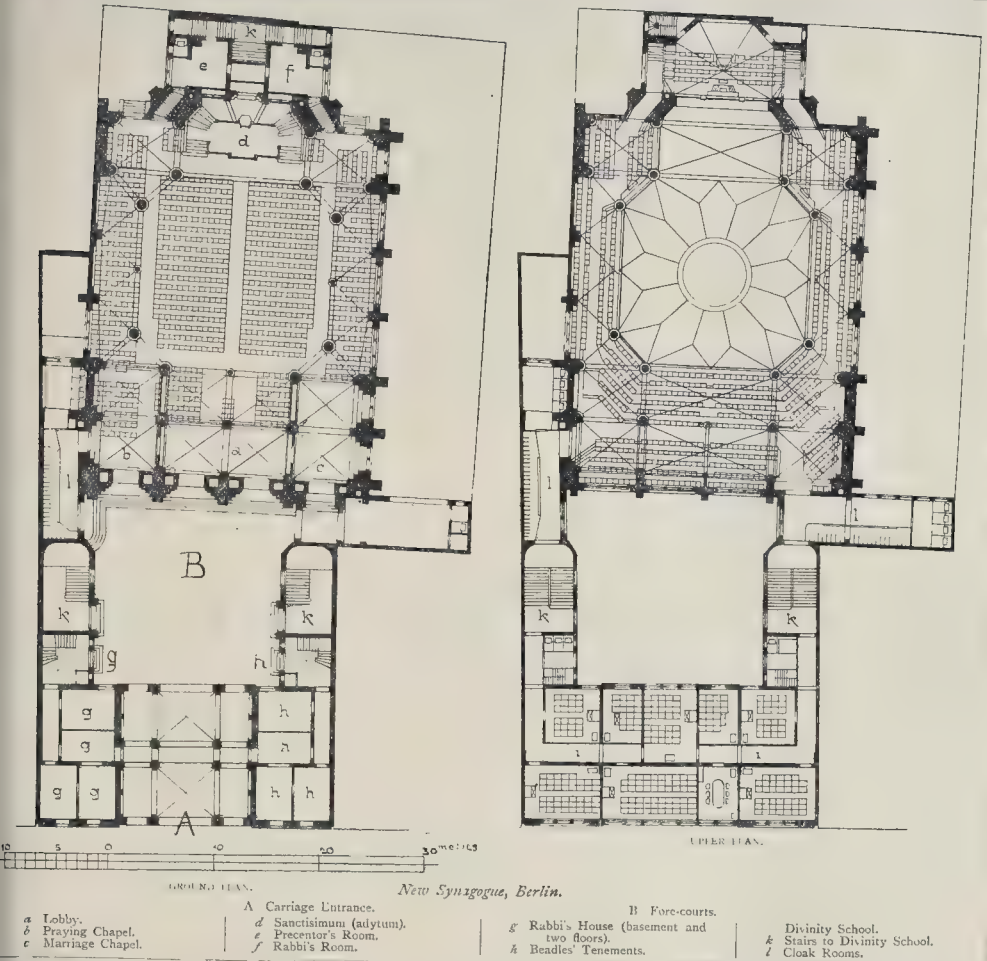
KINDERGARTEN

THE FROEBEL EDUCATIONAL INSTITUTE COLET GARDENS WEST KENSINGTON

JOHN S. QUILTER F.R.I.B.A. ARCHT



PLAN OF THE FROEBEL EDUCATIONAL INSTITUTE, WEST KENSINGTON, LONDON, 1901.



is month with the subject of "The Vanished Palace" of Whitehall, and giving an account of some of the masques held there in the time of King James, and probably schemed and arranged by him. The illustrations include a portrait of King James, a view of the river-front of his projected palace, and a reproduction of Fisher's plan of the Palace of Whitehall and its surroundings in the time of Charles II.

Longmans' Magazine contains an article on Lesseps, by Mr. W. H. Wheeler, which, as far as the history of the Suez Canal is concerned, is both interesting and true, but endeavours to whitewash de Lesseps in regard to the Panama scheme to an extent which it is quite impossible to concur in.

The *English Illustrated* includes a short article by Mr. Edward L. Cutts on "Two Dozen Greek Coins," with illustrations of the coins in question. The article gives a good idea of the historic and artistic interest attaching to such relics.

The *Windsor Magazine* contains an illustrated article on the Ruskin Museum at Sheffield, and a portrait of the sage of Brantwood forms the frontispiece to the number.

The *Album* is a new publication in which the illustrations are the chief attraction, and in which it is intended to group these so as to illustrate special subjects. Thus in the current number the literary portion is devoted to certain matters in connexion with the management of the Houses of Parliament, accompanied by portraits of some leading officials; while the "Supplement" consists of a charming series of portraits of "beautiful children." The coloured wrapper, representing a lady seated with her back to the spectator studying an *affiche* of the *Album*, merits notice as an unusually successful example of chromo-lithography, in regard to colour and texture, being

entirely devoid of the crude opposition of colours and hardness of texture too often characteristic of chromo-lithographs.

The *Antiquary* contains an interesting article, by Mr. F. G. Kitton, on "Engravings of St. Albans Abbey," giving an account of old illustrations of the Abbey, with reproductions of some of them.

An article on "Bogus Building" in the *Economic Review*, by "A Practical Builder," draws attention usefully to some forms of jerry-building, but the writer talks libellous nonsense in his remarks about the District Surveyor being "squared" by being employed to make the plans. He ought to know that by the Act a District Surveyor is under the surveillance of another surveyor, appointed by the Council, in regard to buildings executed from his own plans.

[The foregoing notes should have appeared last week, but were unavoidably postponed owing to pressure on our space.]

Illustrations.

DESIGN FOR THE PARIS EXHIBITION OF 1900.

THIS is the bird's-eye view of the design submitted in the recent competition by M. Hénard, architect, of Paris, and one of the three to which the highest premium of 6,000 francs was awarded.

To those who, like most of our readers, know the ground, the design sufficiently explains itself; we may observe that it is one of those in which the Palais de l'Industrie is proposed to be removed

and rebuilt on a new axis at right angles to the river, where it is seen in the view, westward of the formal garden formed on the line of the new bridge.

The Eiffel Tower is unfortunately retained in the scheme; apparently also the Galerie des Machines, but the other buildings of the 1889 Exhibition are altered.

As we have already observed, the selection of a design involving the removal of the present Palais de l'Industrie, for one of the three first premiums, seems to imply that this expedient is favourably regarded, and likely to be carried out in whatever plan is finally determined on.

NEW SYNAGOGUE, BERLIN.

CONCURRENTLY with the recent increase in the number of Lutheran churches in Germany, a number of new synagogues have been erected for the different Jewish communities. Messrs. Cremer & Wolffenstein, of Berlin, have become specialists in the work, and are entrusted with most of the commissions. The synagogue we illustrate did much to give them their repute in this respect, and is at the same time a typical example of the treatment given to this class of work by the architects in question. As the drawings kindly put at our disposal would scarcely do justice to the design, we publish some photographs, for which we are indebted to the publishers, Messrs. Wasmuth, of Berlin, who have included the building in a series they are issuing on modern German architecture.

The new synagogue stands in a somewhat unfortunate site in the Linden Strasse, at Berlin. The frontage of the site is about 100 ft., the depth is about 280 ft., and its greatest width is 140 ft. Besides the place of worship, room had

to be found for a large divinity school, a house for the rabbi, and several tenements for the beadles. The usual forecourt was required. The architects have provided a spacious carriage entrance to the forecourt, with side passages for foot-passengers. On either side of the passages are the tenements referred to, and over these is the divinity school. On either side of the forecourt there are separate entrances to the tenements and to the schools. The latter have ample staircase accommodation, and the class-rooms are carefully planned. There are eight class-rooms with 260 seats altogether, a common-room, and the necessary lavatory accommodation.

The arrangement of the actual place of worship will be seen from the plans. There is seating room for 900 men on the ground floor level, and 900 women in the galleries. The approach to the latter is by the same staircases as lead to the divinity school. As is usual in synagogues, there is very ample cloak-room accommodation, and a number of lavatories. Fifty extra seats are provided for the members of the choir, who occupy a gallery behind the altar-screen. Besides the lighting from the sides shown in the plan, there is a large skylight. The span of the vault in which this top light is measures 18 m., or 60 ft. The skylight has a diameter of about 20 ft.

The building has a combined system of hot-air and hot-water heating. The artificial lighting is by incandescent lamps augmented by a system of emergency lighting by gas. Recourse has been had to iron construction where possible, and all modern improvements have been introduced. The building cost £1,000, and was completed in eighteen months.

The architectural treatment of the exterior is somewhat nondescript, in red brick, picked out with brown or green glazed bricks. The style might be termed Hanoverian, which means a modern adaptation of the North German Romanesque carried out in brick. The façade towards the Linden Strasse is not successful, but the elevation of the main block which faces the forecourt is more interesting. Of the interior treatment our readers can judge for themselves. All the piers, and all portions in which carved ornament could suitably be introduced, are of a red freestone, whilst the large wall-surfaces and soffits of the vaults are in stucco, treated with colour-design. The altar and screen show some excellent bronzework and fine embroidery. The woodwork throughout the building is oak.

Messrs. Gremer & Wolfenstein's commission is the outcome of a limited competition, in which twelve architects participated. Herr Topp was the chief assistant in charge of the work.

A HOUSE IN CLEVELAND.

This small house, proposed to be erected on the Yorkshire moors, will be built of local stone ashlar, the roofs being covered with Whitland Abbey slates. Mr. Arthur Edmund Street, M.A., is the architect.

PROPOSED TOWER, DEWSBURY CHURCH.

The restoration of the lower part of the tower with the addition of new buttresses and a belfry stage, together with the rebuilding of the north aisle, are the only portions of this restoration still remaining to be done, and will be carried out at an early date. The cost of the scheme, when complete, will be upwards of 25,000.

The chancel and transepts were rebuilt some ten years ago, and the restoration of the nave roof and rebuilding of the south aisle are at present proceeding. Holmfrith stone ashlar is being used internally and externally; the roofs are lead-covered and are ceiled with oak panelling. The existing clearstory windows shown in the drawing have been replaced by others of a more suitable character. Messrs. H. Willcock & Co., of Wolverhampton, are the builders for this portion; Mr. Arthur Edmund Street, M.A., being the architect.

HOUSE AT DISLEY.

This house is now approaching completion, on a very elevated position overlooking the Cheshire and Derbyshire hills. The outside walls are faced with red Ruabon bricks, with Darley Dale stone quoins and dressings, and the roofs are covered with tiles.

The architect is Mr. John Brooke, of Manchester, and the drawing was exhibited at the last Royal Academy exhibition.

FROEBEL EDUCATIONAL INSTITUTE.

The scheme initiated about five years ago by Mrs. Salis Schwabe, for the establishment in England of a model institution which should serve as a practical example and illustration of the results to be derived from the application of Froebel's educational methods, has resulted in the erection of a portion of the building shown in one of our illustrations. The centre building, which has just been erected from the design of Mr. John S. Quilter, forms the training college for teachers on the Froebelian method. On either side of this it is proposed to erect kindergarten schools, with covered gardens and open playgrounds. The college provides accommodation for 125 students, and each kindergarten school will provide for 100 children, one of the schools being intended to be free, the other for paying scholars, and it is intended that the system shall not be confined to the infant school, but continued to the higher stages of education in accordance with the principles laid down by Froebel.

The basement of the college contains rooms for a caretaker, students' cloak-room and dining-room, and a class-room for domestic economy. The ground floor is shown in the illustration, and the upper floor has a large assembly-room and two class-rooms.

JOHN S. QUILTER.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday, in the County Hall, Spring Gardens, Sir John Hutton, Chairman, presiding.

The Blackwall Tunnel.—Mr. W. J. Bull, in bringing up an adjourned report of the Bridges Committee, said that the work in connexion with the Blackwall Tunnel had recently been attended with much anxiety. The compressed air had rushed out, causing a waterspout 18 ft. high, but serious consequences had been averted, and since then the work had been proceeding favourably.

Shaftesbury Memorial Fountain.—The Improvements Committee presented a recommendation to the effect that they be authorised to arrange for the drainage of the top step of the Shaftesbury Memorial Fountain by the insertion of an open cast-iron grating at a cost of about 30l.

Mr. Norton proposed that the recommendation be referred back for further consideration. He said that the fountain was a hideous and unsightly object, and he should like to know how much longer the Council was to go on tinkering with it at the expense of the ratepayers.

Mr. Roberts seconded the amendment, which was carried.

Combined Drainage. The Main Drainage Committee brought up a report, of which the following paragraph is part, the recommendation being agreed to:—

"On the 20th of November last we reported to the Council that representations had been made to us by various local authorities on the subject of the law as regards combined drainage, and that they had asked the Council to promote legislation with a view to an alteration in the definitions of the words *drain* and *sewer* in the Metropolitan Management Acts. The following extract from our report it may be well to repeat, as it gives a brief statement of how the matter at present stands. 'The present definition of the word *drain* (Sec. 150 of the Act of 1855) is—"any drain of and used for the drainage of one building only, or premises within the same curtilage, and made merely for the purpose of communicating with a cesspool or other like receptacle for drainage, or with a sewer into which the drainage of two or more buildings or premises occupied by different persons is conveyed;" and also (Sec. 112 of the Act of 1862) "any drain for draining any group or block of houses by a combined operation under the order of any vestry or district board, or pursuant to the order or direction or with the sanction or approval of the Metropolitan Commissioners of Sewers." Old combined drains into which the drainage of more than one house is conducted are *sewers* within the terms of the Metropolitan Management Act. These drains were no doubt originally constructed for the accommodation of the particular houses, and in some cases through private land. It is now found that they are defective and wearing out, and their repair and renewal involves considerable expense and difficulty to the ratepayers. It is, therefore, suggested that the meaning of the word *drain* should be extended so as to include any drain the plan of which has not been approved as a sewer under Sec. 69 of the Act of 1855 and Sections 45 and 48 of the Act of 1862. The result would be to transfer from the local authorities the liability under which they now are to maintain and repair these sewers, and to cast it back upon the owner of the

property. It is admitted as regards drains hereafter made that no protection is needed, and the suggested legislation is, therefore, entirely retrospective. We concluded the report with a recommendation that the Council should not promote the desired legislation, but this was by leave of the Council withdrawn. Since that time we have received numerous deputation on the subject, representing large majority of the vestries and district boards. Having heard the deputation, we are of opinion that a grievance exists, and that a heavy responsibility is thrown upon the local authorities to repair combined drains, which, it was pointed out, were laid down for the benefit of the owners of the houses and with the intention, as the deputation contended, that the owners should be held responsible for their maintenance. Having carefully considered the matter, we have come to the conclusion that the Council should, as the central authority, promote legislation in accordance with the views of the local authorities and we recommend:—

"That the Council do apply to Parliament for amendment of the definition of the words *sewer* and *drain* in the Metropolitan Local Management Act in the manner desired by the local authorities, and that it be referred to the Parliamentary Committee to prepare a public Bill to take such other steps as may be necessary for the purpose."

The Water Question.—The Water Committee brought up a long report containing the following recommendations:—

"(1.) That the Council is of opinion that the scheme for a system of storage reservoirs, presented to the Royal Commission on the subject of water supply by the Water Supply Committee, is a desirable one, and that it be referred to the Royal Commission to prepare a public Bill to take such other steps as may be necessary for the purpose."

Mr. Bassett Hopkins (Chairman of the Committee) in moving the adoption of the Report said that after a long and careful consideration of the Staines reservoir scheme, of which the Royal Commission had given a qualified approval, the Committee had come unanimously to the conclusion that that scheme, accompanied as it must be by an enormously increased abstraction of water from the Thames, and by an exceedingly expensive system of checking and supervision, was not the true solution of the problem. The subject-matter of the inquiry of the Commission was only a fragment of the whole question. The Lambeth Company had storage for 60 days' supply, the West Middlesex for six and a half, and the Grand Junction for three and a half, and the Southwark and Vauxhall for only one and a half. Yet there was an opinion, tolerably widely entertained, that the storage of water should represent not less than twenty days' supply. The Committee showed that water taken from the companies' mains contained living animals far larger than bacilli, though still microscopically small, was suggested that the present filters should be improved, but how was that to be done? The Chelsea Company's filter beds were 8 ft. deep, but he knew of one company whose filter beds were only 3 ft. 6 in. deep. Then how were they to prevent the companies running their water through the filters at an undue velocity? They might make regulations, but it would require an army of inspectors to see that they were carried out. The reservoir scheme was an impracticable one. It would be necessary, if those reservoirs were constructed, to have 500,000,000 gallons of water coming down to Staines, but it constantly happened that they did not have so much coming down to Teddington. Finding the river supply in such a condition, what was to be done? The alternative was the obtaining of a purer supply from a new source.

On the motion of Sir John Lubbock, M.P., the debate was adjourned.

The Council rose at seven o'clock.

LIVERPOOL ENGINEERING SOCIETY.—The usual fortnightly meeting of this Society was held at the Royal Institution, Colquhoun-street, on 16th inst., Professor H. S. Hele Shaw, M.Inst.C.E., President, in the chair, when a paper read by Mr. Henry H. West, M.Inst.C.E., M.Inst.N.A., entitled "The Principles of Stability in Ships." The discussion upon the paper was adjourned to the meeting of February 20.

COMPETITIONS.

CHURCH, BELFAST.—The competition for a church at Elmwood-avenue, Belfast, has been decided as follows:—1st Premiated design by Mr. Walter Planck, 33, Beauchamp-road, London, S.W.; 2nd. Messrs. Philip Henry Tree, F.R.I.B.A., and Ivor Stuart Price, 70, Warwick-road, Earl's Court, S.W. The assessor was Mr. W. J. Gilliland, architect, Gresham Chambers, Royal-avenue, Belfast.

COTTAGE HOSPITAL, ALDERSHOT.—In this competition the assessor, Mr. W. D. Caroe, 35, Bond-street, London, has issued his report. Ninety-four sets of designs were sent in, and in the opinion of the assessor no high average of skill in hospital planning has been attained, nor has evidence of general knowledge or sufficient study of hospital requirements been shown by the competitors. He has awarded the premium to the design marked with a double circle, No. 40 of those received (Mr. T. Davison, Chelsea), and compliments the author of the design "M.D."

BUSH HILL PARK SCHOOLS.—Mr. Macvicar Anderson, the assessor, has awarded first place in this competition to the design by Mr. G. E. T. Laurence, A.R.I.B.A., 181, Queen Victoria-street, E.C., and the Enfield School Board has adopted his award. The school will accommodate 300 boys and 300 girls. There will be an assembly hall on the ground floor, common to both departments. Twelve architects competed.

ARCHITECTURAL SOCIETIES.

LIVERPOOL ARCHITECTURAL SOCIETY.—The fifth ordinary meeting of the forty-seventh session of this society was held on Monday in the Law Library, Union-court, Castle-street. Mr. H. Hartley, President, occupied the chair. The paper for the evening was contributed by Mr. Leonard Stokes, of London, who addressed the meeting on "Observation." A great deal of a young architect's work and career, he said, depended upon how and to what extent he fixed his mind or attention upon certain subjects. They might safely say that observation was the principal factor in the training of an architect. The eye should be trained to see things in perspective even though they were only drawn in elevation; and if the eye could not at first be brought to do this the hand might be sworn in, for the habit of thinking, sketching, and seeing things in perspective would be found of the greatest use in designing. Far too much work was thought out only on the flat, and hence when executed was unsatisfactory. Observation was the never-failing remedy, and it was surprising how, after a little of it, the brain and eye became most obedient and expert, and could either think or see round corners with the greatest ease. Young architects should observe how the best men get their effects, and also where they failed, for perhaps one of the greatest uses of observation lay in its teaching what to avoid. Observation must also be carefully applied to the clients, and their little eccentricities studied.

LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.—Mr. Axel H. Haig, R.P.E., delivered a lecture, on the 11th inst., to the members of the Leeds and Yorkshire Architectural Society, in the Law Institute, Albion-place, Leeds. Mr. E. J. Dodgshun presided. The subject of the paper was "Wisby and Gotland in the Baltic." The lecturer first dealt with the religion, customs, and legends of Gotland, an island of which Wisby is the principal town. The churches were at first constructed of wood. By-and-by they were replaced by stone buildings, but not a single entirely new church had been erected since 1411. The wall surrounding Wisby was erected during the latter half of the thirteenth century, and was, perhaps, the most remarkable work of its kind. The first wall was in the course of years heightened and thickened, and between the existing towers smaller towers were constructed. The wall was from 20 ft. to 30 ft. high, and the towers from 60 ft. to 70 ft. high. Five of the large towers contained the town gates, which had formerly portcullises and out-works. The wall was 11,200 ft. in extent. In the ancient days that wonderful construction protected fifteen churches, the King's palace, and streets swarming with merchants, soldiers, sailors from all parts, priests, and civilians. That continued till 1361, when the place was taken and plundered by a Danish king. The town revived after that, but the crash came in 1525, when it was stormed, and the northern part burned. Mr. Haig went on to describe the more interesting features of his sketches, principally of churches, which were thrown on the screen. At the con-

clusion a vote of thanks was accorded to Mr. Haig, on the motion of Mr. Tindall.

SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.—The ordinary monthly meeting of members of this Society was held on Tuesday, the President, Mr. E. M. Gibbs, in the chair. Mr. John Holden, F.R.I.B.A., F.S.I., the President of the Manchester Society of Architects, delivered a lecture on "Ancient Lights." He first explained the meaning of the term "ancient lights" and its application in relation to property generally, referring to the first recorded instance known to him of such a question (named in Gibbon's *Decline and Fall of the Roman Empire*) as occurring A.D. 829. He then explained the mode of dealing with the question up to the passing of the Prescription Act in 1832 (2 and 3 Will. 4, c. 71) which was quoted and explained, and went fully into the various questions connected with the subject in modern practice. A discussion followed, and a request was made that Mr. Holden would allow his paper to be printed.

EDINBURGH ARCHITECTURAL ASSOCIATION.—A meeting of this Association took place on the 6th inst. in the Royal Institution, Mr. W. W. Robertson, the President, in the chair. Mr. Percy Fitzgerald, F.S.A., made a communication on "Adam Architecture in London." Having suggested that there were at present symptoms of a revival of interest in the work of this illustrious family of architects, the lecturer proceeded to deal in considerable detail with the architecture of Robert Adam, whom he described as "the flower of the flock," and a man of extraordinary versatility, dramatic power, and ability. His style was inspired by Diocletian's Palace at Spalato, with all the peculiar incidents of which he became permeated. On Adam's return to this country, the lecturer showed how extensive his practice became, giving it as his opinion that no other architect ever enjoyed so large an amount of remunerative work. In London alone it was almost incredible the number of buildings he set up. As to his principles of style, one of the most outstanding features was his marked individuality, Adam putting his stamp on everything he did. His exact sense of proportion, his great care as to the minutest details, and his singularly refined taste in various directions were notable characteristics of the man. Dr. R. Rowand Anderson, in moving a vote of thanks to the lecturer, said there was no doubt that the architecture of Adam was beginning to have its weight in the architectural study of the rising generation of architects, and they were fortunate in Edinburgh in possessing some of his very best examples. The Register House, to his mind, was the finest thing they had in the city. At the same time, he thought the father's work was a much more vigorous type of work than the son's. Professor Baldwin Brown seconded the vote of thanks, which was cordially passed.

EDINBURGH SCHOOL OF ART.—On the 9th inst. Mr. S. Henbest Capper, architect, delivered a public lecture on "Hollyrood Abbey," in connexion with the old Edinburgh School of Art, in the Free Assembly Hall. The chair was occupied by Mr. J. R. Findlay, who, in the course of some remarks, expressed regret that the Royal apartments in Hollyrood Palace, which had very considerable architectural interest, were not open for public inspection. Mr. Capper explained that he was to deal with Hollyrood Abbey as distinct from the Palace, and showed, with the help of limelight illustrations, how fragmentary were the remains of the original building. He afterwards had thrown upon the screen pictures of a number of well-known ecclesiastical buildings in England, with the view of conveying to the audience some idea of the parts of the Abbey Church that have been swept away. In reference to the history of the church, he recalled the legend of King David and the stag, but pointed out that it was not till after the year 1400 that mention came to be made of it in connexion with the foundation of the Abbey. Mr. Capper subsequently spoke of the leading characteristics of the building from an architectural point of view. On the motion of Mr. W. K. Rose a vote of thanks was accorded to Mr. Capper, while the Chairman was also thanked for presiding.

PLYMOUTH SCHOOL OF ART.—In the twelfth lecture, delivered on the 7th inst., at the Plymouth School of Art, Mr. B. Priestley Shires, A.R.I.B.A., dealt mainly with the subject of Early English architecture, and explained the characteristic features of the different kinds of windows and doors, with their ornaments and enrichments. As regards the latter, Mr. Shires said the opening of the thirteenth century saw a new era in ornament, all attempts at Grecian and Roman imitation were given up, the heavy massiveness

of the Norman style shaken off, and succeeded by a true English style, with a lightness and peculiarities not to be found even in Continental work. In some cases the carving is very free and graceful, but as a rule there is a spirited stiffness in the forms which is very characteristic and pleasing.

ARCHAEOLOGICAL SOCIETIES.

BRITISH ARCHAEOLOGICAL ASSOCIATION.—On the 6th inst. a meeting of this Association was held, Mr. E. P. Loftus Brock in the chair, when Dr. Fryer exhibited some photographs of the well-known monument at Igel, on the Moselle, showing the original base brought to light in recent excavations; he also contributed a paper upon the subject, which was read by Mr. Birch. Mr. R. B. Barrett reported some discoveries he had recently made at the south-east corner of the Palace at Croydon, beneath the ground-level, consisting of Norman masonry having zigzag mouldings, apparently the remains of an arch. This discovery was regarded with particular interest, inasmuch as it is the first recorded instance of Norman work having been found there, all other portions of the existing buildings being of much later date. The chairman alluded to some remains of later date which had been discovered in recent years in the old buildings of Croydon Palace. Dr. Sparrow Simpson next read a paper on the "Head of Simon of Sudbury, Archbishop of Canterbury," and an interesting discussion ensued, in which the author, the chairman, Mr. Pritchard, and others took part.

SOCIETY OF ANTIQUARIES OF SCOTLAND.—The usual monthly meeting of the Society of Antiquaries of Scotland was held on the 11th inst., Mr. Gilbert Goudie in the chair. The first paper read was a description of a supposed mithraic temple, recently discovered at Woudham, in Kent, by Mr. James Lang, F.S.A. Scot., of Glasgow. Dr. David Christison, Secretary, gave an account of the forts on the southern slopes of the Lammermoors and the Moorfoots, which are generally distributed along the valleys of the smaller streams falling into the Tweed. Mr. Lockhart Bogle, F.S.A. Scot., gave an account of several Pre-historic structures in Glenelg and Kintail, with ground plans and sketches. In the next paper an account was given of the discovery of a cist, with a cup-and-ring marked cover, in a sand-pit at the Cunningham, Tillicoultry. The cist was of the usual character, but the covering stone was a huge block of granite six feet in length, and sculptured on its upper surface with rings, spirals, and lines. There was exhibited a finely-ornamented urn found near Harvieston Castle, which is now preserved in the Dollar Institution. In the last paper Bishop Dowden called attention to two late notices of the cultus of St. Ninian in England.

BOOKS.

Wood-working Machinery; its Rise, Progress, and Construction; with Hints on the Management of Saw-Mills, and the Economical Conversion of Timber. By M. POWIS BALE. Second Edition, with additions. London: Crosby Lockwood & Son.

THE historical matter with which Mr. Bale opens his subject is interesting. It is astonishing how little the form of hand tools has changed from primitive times. "The saws of the Grecian carpenters," we are told, "had a similar form to ours in use at present, as shown by a painting still preserved among the antiquities of Herculaneum. Two genii are represented at the end of a bench; the piece of wood which is to be sawn through is secured by cramps. The saw with which the genii are at work has a perfect resemblance to our frame-saw. It consists of a square frame having in the middle a blade, the teeth of which stand perpendicular to the plane of the frame. The arms in which the blade is fastened have a similar form to those we now use." The author might support this instance of the endurance of primitive forms of tools by many others, notably that of remains of tools used by the constructors of the Pyramids; but this would have taken him out of his province, as the remains of tools found at the Pyramids are of those used for masonry working. The author says, "The circular-saw is said to have originated in Holland in the sixteenth and seventeenth century, but there is nothing to show who was the inventor. One of

the earliest records of its use in this country is contained in the patent specification of Samuel Miller, of Southampton, granted in the year 1777, in which he claims "an entirely new" machine for more expeditiously sawing all kinds of wood, stone, and ivory, and the saws used are of a circular figure." No doubt Samuel Miller would have been a good deal surprised had he been told that his entirely new invention was at least three thousand years old, for there is unmistakable evidence of the use of the circular-saw for stone-work in a fragment of diorite found in the Pyramids. It may be of interest to add that saws at least 8 ft. long, and some kind of lathe with a mechanical rest, were used in preparing the stone of the Pyramids and fragments of utensils found in them. If these tools were used for stone-working, it is reasonable to suppose they were also applied to the conversion of wood.

Leaving the historical matter we turn to the body of the work, which contains descriptions of the various wood-working machines in most general use, such as saw-benches, frame-saws, planing machines, band-saws, moulding machines, mortising and boring machines, general joiners, dovetailing machines, copying lathes, &c. There are a great many illustrations, both in the shape of folding plates and wood-cuts, incorporated in the text. Many of these have the appearance of having been taken from manufacturers' catalogues. They are well selected and the explanations given are generally sufficient. Beyond this there is not much that need be said in dealing with this second edition, excepting that insufficient effort appears to have been made to bring it up to date; indeed, what may be styled the ancient history department occupies altogether disproportionate space in a book intended for working reference. The chapter on "Motive Power for Driving Wood-working Machinery" is somewhat crude. Automatic expansion slides, controlled by sensitive governor gear, and steam jacketed cylinders, are not always unmixt blessings in a saw-mill, as the author seems to imply; and there are situations in which a condenser may not be a source of economy; moreover, the reciprocating parts of an engine, working in straight lines, necessarily do not move in an opposite direction to rotating counter-weights attached to cranks. The author appears to be unacquainted with the results of modern research in connexion with this subject. One would also gather from Mr. Bale's remarks, that steel as a material for boiler construction had not yet been introduced, for he mentions on two occasions that boiler-plates are made of iron, whilst no reference is made to the more modern material. The eulogy of asbestos as a packing for steam piston-rods would not be endorsed by competent engineers of the present day in face of the superior results obtained with the more modern metallic packings. This chapter, however, like those which precede it, does not bear the appearance of having been brought up to date, and does not justify the year 1894 which appears on the title-page. On reading further we find that there is another chapter on motive machinery at the end of the book; but we allow the above remarks to stand, although the author corrects some of the defects above referred to. The practice here followed of publishing antiquated matter under a modern date, and supplementing it with other chapters on the same subject at the end of the book, is extremely inconvenient, and likely to lead those consulting the work into serious error. At the least the reader should be informed of this misleading scheme of arrangement in the preface. In another chapter near the end of the book the subject of band-saws is continued, the practice being brought up to more recent times than in that section which is in the earlier part of the work. There is nothing, however, in the first chapters on the subject to indicate that it will be continued later on.

Calcareous Cements: Their Nature and Uses, with Some Observations upon Cement Testing. By GILBERT R. REDGRAVE, Associate of the Institution of Civil Engineers, Telford Gold Medallist, and Officier de la Légion d'Honneur. With diagrams. London: Charles Griffin & Co., Limited. 1895. Pp. xv. and 238; 30 illustrations.

This is a good book with a misleading title. "Calcareous Cements: Their Manufacture and Nature," would have better explained the scope of the work. From the title the reader would expect to learn a great deal about the thousand and one purposes for which cements are used, but the whole question of the "uses" of cements is dismissed in one short chapter of nine pages,

entitled "The Composition of Mortar and Concrete." On the other hand, the "manufacture" of Portland cement alone occupies five consecutive chapters, or sixty-one pages, upwards of one-fourth of the whole book. Taking the book as it stands—apart from the title—we can recommend it as a careful and valuable contribution to a large and, in some respects, abstruse subject. The introductory chapter deals briefly with the chemical relations of the most important constituents of limes and cements. Chapters II. and III. are mainly historical, the early numbers of the *Builder* being largely drawn upon. "The Composition of Portland Cement" is discussed in Chapter IV., attention being called to the danger of light ("over-clayed") and heavy ("over-limed") cements, and of excessive quantities of sulphur and magnesia. The manufacture of Portland cement is fully described in Chapters V. to IX., and is illustrated by several drawings of machines, &c., one of the most interesting of which is the Grusonwerk ball-mill for grinding cement. After the short and entirely inadequate chapter on mortar and concrete, the important subject of "Cement Testing" is discussed. The author wisely condemns the weight test on account of its uncertainty, and objects, as we have already done, to the specific gravity test as being "too refined for actual practice," and because "it certainly furnishes no guide as to the quality of the material." The test for tensile strength is considered at great length, but sufficient stress is not laid on the importance of that test with sand, and in quoting Professor Unwin's formula for the induration of cement from his paper in the *Journal* of the Society of Chemical Industry for 1886, Mr. Redgrave does not make it clear how the values of b are obtained, and does not appear to be acquainted with the Professor's later statement of the formula in his book on "The Testing of Materials of Construction." The hot-water test for soundness is mentioned, but it is strange that nothing is said of Mr. Henry Faija's part in devising and advocating this test; surely this is not because Mr. Faija is the author of a rival work on Portland cement. No space is devoted to consideration of the adhesive, transverse, and compressive strength of cement, and the importance of fine grinding is not as clearly shown as we expected from Mr. Redgrave. Chapter XII. deals with the chemical analysis of Portland cement, and is followed by chapters treating, *inter alia*, of slag cements, siliceous and plaster cements. The concluding chapter is devoted to "Specifications for Portland cement, but contains nothing new, the author somewhat lamely concluding with the words "We hesitate, with all these differences of opinion, to give our own views as to a model specification. We can only hope that unanimity may ere long be established, and that the adoption of a uniform system of testing may lead to the use of a standard form of specification."

Notwithstanding the limitations to which we have alluded, the book covers a wide field; it is evidently based on diligent research and practical experience. It is clearly written, accurate (as far as we have tested it), and well illustrated, and contains an excellent index. If another edition be required (and we think it will be), we hope that Mr. Redgrave will expunge or alter the sentence in the preface, in which he says "I have appended a full translation of the German rules for testing, which, I think, have not previously been published in this country"; seeing that a full translation of these rules (although not of the instructions and explanations accompanying them) appeared in our columns on November 1, 1890, having been kindly sent to us by Mr. H. A. Roechling, of Leicester.

Electric Light and Power. By ARTHUR F. GUY. London: Biggs & Co. 1894.

FROM the author's preface it seems that his firm has been to write a book that shall give only "useful practical knowledge." Some books, he says, are "mathematical, some school text-books, some theoretical." This book, then, is intended for those who have not studied in the schools, who have little or no knowledge of mathematics, and who desire no acquaintance with abstract theory save that absolutely necessary for "useful practical knowledge."

Hateful as mathematics and theory may be to the intended readers of this book, they must have no such distaste for prose poetry when such matter, for instance, as the power of the tides is

discussed. "Twice daily do the billows surge and thunder on the shore, and it is only when one guesses, fascinated, at the wide glittering expanse, the seething waters as they hurt themselves on a rock-bound coast," &c. "Truly the foam-flakes the expressive token of all this energy, possess as much value as if they were solid flakes of silver," &c. The practical man may be puzzled not a little at this bathos, but he will be more puzzled when he gets to the "absolutely requisite theory," more especially if he has ever looked into the despised "school text-book." The authors of recognised school text-books accept, just as Lord Kelvin, Professor Tate and such men always do, Newton's laws of motion, but Mr. Guy will follow no such leader. He tells us that when a mass of lead falls to the earth, "the force the lead exerts is comparatively nothing to the force the earth exerts." The absurd fallacy involved in the denial of the third law of motion may escape most readers, and thus do no great harm, but the same indulgence cannot be extended to definitions of the common units. The author is grieved to think "how barbarous and ridiculous our units of measurement are;" the following is an example of how he proceeds to put things right—*The Unit of Force* is named the "dyne," and it is "that amount of force which, acting for one second when applied to a mass of one gramme weight will move it through a distance of one centimetre in one second of time." These two examples are sufficient to show that Mr. Guy is ignorant of the most elementary principles of dynamics.

A writer may not appreciate Newton's laws, but he is capable of making a deduction from them, at least he could copy an orthodox definition of the dyne, and not define a force which is two dynes if it is anything. If it is absolutely necessary that a working engineer shall know, say, the distinction between mass and weight, which Mr. Guy does not, such books as this should pass through the hands of a capable editor; if it is not necessary, why cumber the pages with immaterial rubbish?

Of the general scope of the book no more need be said than that it is the same as that of most octavo volumes dealing with the subject. This chapter is on the evolution of electrical engineering, the sixth and last on the distribution of electric power.

In the earlier portions of the work we get examples of prose poetry, but the information given about secondary cells is a yet finer example of the laconic style of writing. The following *al!* it seems necessary for a practical man to know about storage: "Shunt dynamos are always used when possible for charging secondary batteries."

Correspondence.

To the Editor of THE BUILDER.

DISTRICT COUNCILS AND NEW BUILDINGS.

SIR,—It is very difficult to fix an argument of the Clerk to the Wimbledon District Council. When his Board is charged with allowing building to be erected in violation of their own by-laws, he says the Board cannot interfere, because the building is an addition to an old building, older than the by-laws. When pushed into a corner by the reply that if that is so, any one possessing an old cottage may tack a mansion on to it without regarding the by-laws, he slips away, saying, "No; in each case the Board has to decide upon a question of fact whether the building is exempt or no, and it would not sanction so extreme a case as that suggested." He therefore admits, in spite of himself, that the Board has after all a discretionary power of intervention. When further pressed to say when the line of intervention is drawn he declines to answer. Let us then test their discretion by the case out of which this correspondence arose. The plan you were good enough to publish shows that the builder could not well have gone farther in infringing the conditions of open spaces; he has all but covered with his new building the whole area which the by-laws would keep open. Here, surely, is an extreme case calling for the exercise of that discretionary power of which we are told, and the Board had an unusual motive for caution in the fact that the builder and owner of the intruded structure was its own Chairman. And what happened? The Board not only refused to interfere, but actually examined the plans and sanctioned them. The Board is therefore, in this dilemma—either they have discretionary power of intervention and decline

* See the *Builder* for August 20, 1892, &c.

to use it in a gross case such as this, or they have no power of interfering at all in the case of any addition, even of a mansion, to any building, however insignificant, provided it is older than the Public Health Act.

The Clerk to the Wimbledon Council concludes by suggesting that a private individual can take out a summons against a builder under the by-laws if he is dissatisfied with the inaction of the local authority. Perhaps he may. But if he is to be driven to that, what, I would ask, is the use of the local authority and the by-laws which it is elected to enforce for the protection of the district? It is the popular belief, not always perhaps well-founded, that local authorities exist for no other purpose than to administer fairly and impartially those regulations which have been approved as necessary and convenient for public health and individual security.

THOS. G. JACKSON.

PROFESSIONAL ADVERTISING.

SIR,—I believe I have a grievance in common with every pair of guineas to the Royal Institute of British Architects. We hear on all sides, and from various quarters, of the desirability of raising the status of the profession in the eyes of the public to its true position amongst the callings of men, and from no quarter do we hear this more (or more appropriately, as must be admitted) than from the Institute itself—whose very existence has surely the utterance of this end as one of its chief aims.

We look to the Institute to protect us from the tradesman spirit; and some of us look on the Institute (not with sympathy) as the embodiment of the Professional spirit; yet, let anyone take a walk past the front of the Middlesex Hospital, and we will see on a building in course of construction in its vicinity, an evidence of how vain is the trust we repose in our representative body. For there is to be seen, painted on a huge advertisement board, the name of the architect of the building, in letters full in the face, with all his titles and degrees, and that without any such excusing prefix as "Apply to—". It is a simple, straightforward, honest, unblushing, unprofessional advertisement. What impression are such things calculated to make upon the public mind as to the status of the architect?—What of the Institute which seems to lend its sanction with the fine letters F.R.I.B.A. so plainly to be read upon the board? What, moreover, can we hope for from the Institute itself when we recognise the name of which I am speaking as that of a member of the Council?

If architects recognise any such thing as "professional etiquette," are we to believe that the Council of the Institute does not regard such an advertisement as a grave breach of it? If so, surely one of the greatest advantages held out as an inducement to membership of the Institute does not exist. It would be interesting to know whether the advocates of the examination are able to reconcile in examination in professional practice with such an example in professional conduct.

It is just as if (to borrow the simile of a fellow-officer in this grievance) one were to see in a street sign with the straw which betokens a serious illness, board affixed to the area-railings (say) of a house, bearing the legend—"The case within is under the care of Sir Stephen Stethoscope, M.D., F.R.C.P." Might not the Royal Institute of British Architects do as the Royal College of Physicians would in such a case? I enclose my card, and beg to sign myself

"A.R.I.B.A."

* * * It may be that in this and some other cases the architect's name has been put up by a company writing the buildings, and not by himself or at his instigation. But the matter wants explanation.—ED

RAIN AND WIND ON BUILDINGS.

SIR,—I note in your leader of the 2nd inst. Mr. Riminger's experiments for ascertaining the "Wind Pressure on Buildings," and I should be glad to know if you or any of your readers are cognisant of the results of any experiments for arriving at the effect of the weight of heavy rain storms impinging on structures in addition to the wind pressure.

"EPIMETHEUS."

BATH SERVICES.

SIR,—At 8 a.m. to-day my bath service was in perfect order. At 10 a.m. the hot water ceased to flow. Investigation proved that the pipes were not frozen, as the ball-cock, cold cistern, and pipe from the tank to back boiler were all full and working normally. The exhaust was clear, as was proved by pouring hot water down same into the cylinder. The cold bath cock delivered hot water, which could have been explainable if the exhaust were opened; but it was not. At 5 p.m. the whole riven was in its normal condition again. The trench fire was out for some hours during the disengagement. What prevented the water flowing through the hot cock, and what enabled it to do so after some hours' cessation?

PUZZLED.

February 6, 1895.

The Student's Column.

BRICKS AND TERRA-COTTA.—VII.

THE CHEMICAL COMPOSITION OF CLAYS.

WE are now in a position to enquire into the chemical composition of the raw earths themselves. If the student attentively regards the analyses of the commoner minerals found in clays, &c., as given in our last article, he will not have much difficulty in arriving at the mode in which the various chemical constituents occur. Let us consider a simple case by discussing the chemical composition of purer clays, such as are used in the manufacture of porcelain, pottery, and to some extent bricks also.

Chemical Composition of China-clays.

	Silica.	Alumina.	Oxide of Iron.	Lime.	Magnesia.	Water.
1. Best Kaolin.....	46.30	39.74	.27	.36	.44	12.67
2. Coarse china-clay	66.68	26.08	1.26	.84	trace	5.14
3. Average Kaolin	44.60	44.30	.20	1.65		8.74
4. Pipe-clay	53.66	32.00	1.35	.40	trace, 12.08	

Sample No. 1 contained also a small percentage of potash and soda, included under water; it refers to the finest washed Cornish china-clay. Nevertheless, it has minute proportions of iron, lime, and magnesia, and it may be taken for granted that kaolin, as used in the arts and manufactures, is almost always mixed with these or similar impurities. Taking the silica and alumina together, it would appear as though very little free quartz (if any) was present. Comparing the felspars with this analysis, we at once observe that orthoclase nearest approaches it, and we have noticed that mineral in many Cornish granites. But it is quite clear, from an inspection, that the principal felspar concerned is the orthoclase, which occurs in large white crystals. In decomposing, the rock gets rid of the potash in solution, and a fair proportion of the silica disappears in like manner, though much of the latter constituent also provides the substance of which free quartz crystals found in kaolin are formed. The small proportion of iron most likely came from the orthoclase, and the lime from muscovite mica or oligoclase. The presence of magnesia, seeing that no boracic acid is notified, no doubt is due to orthoclase, in which it often sparingly occurs, or to the mica. The water simply represents hydration.

Sample No. 2—coarse china clay—is rather sandy in nature, from which it may be inferred that much free quartz is present, and this is, to some extent, confirmed by the small percentage of water.

Sample No. 3—average kaolin—will be understood from what has been said concerning No. 1.

Sample No. 4—pipe-clay—containing a rather high proportion of iron, from felspar.

Chemical Composition of Fire-Clays.*

	Silica.	Alumina.	Iron oxide.	Lime.	Magnesia.	Water, &c.
5. Newcastle-on-Tyne	51.10	31.15	4.61	1.46	1.54	10.17
6. " "	47.55	24.50	9.13	1.34	0.71	12.01
7. " "	48.55	10.25	4.06	1.06	1.91	10.07
8. " "	51.11	30.40	4.91	1.70	trace	12.20
9. " "	71.28	17.75	2.41		2.21	6.24
10. " "	58.20	8.10	1.68		2.96	1.64
11. " "	65.25	17.90	2.77	1.30		7.58
12. Stourbridge (Brierly Hill)	51.80	30.40	4.14		5.01	1.11
13. Stourbridge	64.70	23.15	1.85			9.5 to 10.00
14. Welsh	50.35	23.50	10.40	1.54	1.45	11.85
15. " "	50.60	24.90	2.83	3.00	1.07	11.60
16. " "	54.80	27.60	2.50	2.00	1.00	11.80
17. Glasgow	65.20	33.41	.49	.30	.13	.45

Comparing samples 5 to 11, we may say that they refer to fire-clays taken from a series of seven seams all worked in the mines belonging to one

* Samples 5-11 given on the authority of Mr. J. Cowen, "Industrial Resources of the Tyne, Wear, and Tees" (1864), p. 203; samples 12, 14, 15, 16, "Ure's Dictionary"; sample 13, Dobson, "Bricks and Tiles," 9th ed. (1893), p. 23; sample 17, Ansted, "Applications of Geology" (1865), p. 115.

maker, situated a few miles west of Newcastle. These layers lie beneath the coal seams and vary in thickness from 1 ft. to 6 ft. The clay is in most abundance, and in best quality, beneath the coal used for coking and manufacturing purposes. It will be seen that the samples vary greatly in composition, the alumina in one being only 8.10, whilst in another it reaches as high as 31.35. All these clays contain a certain amount of sand, and sample No. 10 evidently has an abnormal quantity. The refractory character of any sample of fire-clay is determined by the proportions in which the silica and alumina are contained, and by the absence of lime, iron, and other easily fluxable substances; but we shall have more to say respecting this in speaking of burning and fusibility. Sample No. 6 contains a very high percentage of iron, and the magnesia seems also to be variable, whilst lime is fairly constant. The iron in these cases is, no doubt, largely due to subsequent filtration, and is, therefore, difficult to trace to its original source. Under the microscope we find in a sample from near Newcastle, that much limonite and a little magnetite was present, as well as some biotite mica. The magnesia most probably came from the last-mentioned mineral. It is noteworthy that magnesia is most abundant in the sample containing the greatest proportion of silica, and from the circumstance that only 3.64 of water was found, one is led to suppose that sample No. 10 was chiefly made up of quartzose grains and other matter derived, without much modification, from the destruction of igneous rocks. It is the common practice of fire-brick manufacturers in the north of England to mix divers clays together in proportions suitable for the production of certain classes of goods.

With reference to samples 12 and 13, from Stourbridge, in Worcestershire, it will be noticed that one contains very much more iron than the other, and that, unlike those from Newcastle-on-Tyne, no lime is present.

The Welsh samples, 14 to 16, are remarkable as containing a large proportion of soda, from which it might be surmised that the material was mainly derived from rocks containing oligoclase. No. 14 has more iron than should be possessed by a good fire-clay, and of the three it is by far the worst. No. 15 is stated to give fair results, but No. 16 may be regarded as excellent. The absence of lime is somewhat peculiar.

The sample from Glasgow, No. 17, has an excess of alumina, and it will be noticed that the clay was deprived of water prior to the analysis being made; the .45 mentioned is recorded as phosphates.

Chemical Composition of Pottery Clays.

	Silica.	Alumina.	Lime.	Magnesia.	Iron Oxide.	Water, &c.
18. Sagger Clay	66.10	27.31	.42	trace	5.11	1.52
19. Yellow Clay	43.07	27.38		50.1 trace	1.30	10.30
20. Brown Clay	49.44	34.20	1.48	1.04	7.74	5.14
21. Blue Clay	46.18	36.04	1.20	trace	1.04	13.37

These analyses are given on the authority of Professor Ansted. They refer to clays possessing much greater plasticity than the fire-clays just described. Sample No. 18 is a variety used in the potteries for making *saggers*, and it has been adopted also in the manufacture of crucibles for glass works. It has less alumina than the others mentioned, whilst there is a large proportion of silica. The yellow clay, No. 19, has more alumina and less lime, and its colour is unquestionably due to the presence of so much iron, possibly the peroxide. It is used in the manufacture of coarse ware, and burns yellow. Of No. 20 we note that alumina is increased at the expense of silica, that lime is rather abundant, whilst it has a larger proportion of iron—hence its brown tint—and as much as 1.94 of magnesia. This is a very common species of pottery clay, used only for black and inferior red ware. As might be readily anticipated from its chemical composition, it will not bear exposure to great heat. The blue clay, No. 21, is the best material for pottery, and burns white. It has but little iron, and must be very plastic; some improvement would be effected by a slight proportion of the alumina being transferred to silica, otherwise this is an excellent average material from a chemical point of view. It need hardly be remarked that an enormous number of bricks are made from clays of this class, by the addition of suitable ingredients to assist in agglutination.

Chemical Composition of Brick-earths.

	Silica	Alumina	Iron	Lime	Magnesia	Water &c
22. "Red brick" clay	50.40	24.00	2.70	0.10	0.10	0.10
23. Brick-earth	52.50	11.00	0.10	0.10	0.10	0.10

No good purpose would be served by giving several analyses of brick-earths at the present stage; they vary to such a wide extent, according to their locality and position, and produce such diverse results when burned, that it is hardly possible to speak of them in a general way. We, therefore, thought it would be useful to give one analysis referring to a superior brick-earth, No. 22, such as is used in the manufacture of good sound bricks, and another analysis appertaining to a brick-earth of the worst possible description, No. 23. The excessive hydration of the former, of course, marks it as being specially suitable on account of its plasticity for the rapid moulding of bricks; it does not contain much lime or magnesia; and although the analysis is not as explicit as might be, the clay evidently possesses but little iron also. The small quantity of alumina, as compared with some of the other analyses given, is noteworthy. On the other hand, it is not difficult to see that the inferior brick-earth, No. 23, has too much lime and magnesia; indeed, it should be characterised as marl. Both the last-mentioned ingredients occur as carbonates, which aggravate the case; naturally, it effervesces with acid, and has a tendency to decrepitate locally when subjected to great heat. It was, no doubt, largely derived from the disintegration of limestone.

We do not think it worth while to go into details concerning the chemical nature of slates, or *dbris* from slate quarries, so far as these are used for brickmaking, but it may be remarked that in general they resemble the more impure kinds of clay, with a low percentage of iron, lime, and magnesia, and but very little water. When not easily cleavable the slaty material frequently contains much sand, with large proportions of silica.

In the foregoing observations dealing with the mineral and chemical composition of brick-earths we have not alluded to those clay substances such as are immediately derived from the disintegration of volcanic rocks. These are more interesting to the student of Continental bricks and brick-making than to readers in this country, and all we need say is, that where the clays are obtained by the weathering of acid volcanic rocks—those which contain a considerable amount of silica—the products are generally good; whilst where basic rocks have furnished the material there is liable to be an excess of lime, soda, magnesia, and iron.

In the vale of Neath, Glamorganshire, is a highly siliceous earth, known locally as "Dinas clay," of which the celebrated Dinas fire-bricks are made. The proportion of silica ranges from about 96 to 99 per cent., and it may be mentioned that in the preparation of the material some flux—usually lime—has to be added. The remainder consists principally of alumina, but traces of iron, lime, and magnesia are usually present. Ganister, or Gannister, is a name employed to denote a hard siliceous bed, constituting the floor of some of the Durham and Yorkshire coal-seams. In certain parts of the Continent "infusorial earth" is employed in the manufacture of bricks for specific purposes; they are often so light as to be able to float in water. An analysis of one such earth, found in Tuscany, gave—siliceous earth 55, magnesia 15, water 14, alumina 12, lime 3, and iron 1 per cent. Similar earths have been discovered near Clermont, in the Auvergne, in Poland, and elsewhere.

OBITUARY.

ALDERMAN J. HATCH.—Alderman James Hatch died on the 11th inst. at Lancaster. Deceased was in his seventy-seventh year, had served on the Town Council twenty-eight years, and was Chairman of the Gas Committee many years. He was a builder by trade, and was the head of the firm of Hatch & Sons.

GENERAL BUILDING NEWS.

NEW BANK PREMISES, EASTBOURNE.—Messrs. Molinex, Whitfield, & Co. (Lewes Old Bank) are erecting new premises at Eastbourne, from the designs of Messrs. Mitchell & Ford, architects, of Eastbourne. The style adopted is Italian Renaissance, the ground floor being treated as a base, with panelled piers and plinth, to the first and second floors, which have engaged fluted Corinthian

columns and pilasters, extending the height of both stories, surmounted by engaged Ionic columns. A dome, covered with Braby & Co.'s metallic tiles, is introduced as a central feature. The entrance to the building is in the centre of the ground floor, which contains public office 35 ft. by 20 ft., clerks' office 27 ft. by 18 ft., manager's and partners' private offices, book-safe, and lavatory accommodation. The strong-room is in the basement. On the first floor are arranged various suites of offices, with separate entrance in Terminus-road, and also the manager's reception-rooms. On the second floor are the manager's sleeping apartments. The residential part has a separate entrance in Junction-road. The building is to be faced with Bath stone, the cornices and principal projections being of Portland stone. The roof will be covered with Westmoreland green slates. The internal fittings of bank, screens, dados, &c., are in polished mahogany. Electric light is to be fitted throughout the building. The whole of the plastered work is finished in Keene's cement. The building will be completed in about twelve months. The floors are to be fitted by Messrs. Mark Fawcett & Co. The builder is Mr. M. Martin.

RENOVATION OF DALSERF CHURCH, LANARKSHIRE.—Reopening services have just been held at this church after the renovation of the interior, and the rebuilding and extending the north aisle, re-seating the whole area over a layer of concrete, and providing new heating and ventilating apparatus. The church was built in 1652, and its plain outside appearances has not been interfered with. The old-fashioned outside stairs to the galleries are one of its features. The mason work is by Martin & Symington, the joiner work by Pettigrew & Co., plumber work, J. Hislop, all of Carlisle; the slater and plasterer, Mr. M. G. H. Hamilton; and the heating, by Colquhoun & Son, Glasgow. Messrs. Hay & Henderson, of Edinburgh, were the architects.

CHURCH, KETTERING.—A new church has just been erected at Kettering, at a cost of about 7,000l. The architects were Messrs. Gotch & Saunders, of Kettering, and the structure is built both inside and out mainly of local sandstone, and the walls are of Weldon stone. The nave and aisles are 93 ft. by 44 ft., and the chancel 40 ft. by 25 ft. There is a narrow aisle on either side of the nave by which the seats are approached. The whole of the seating is in the nave. The baptistry is a projection at the west end, and there is a large vestry for the choir, and a vestry for the clergy. A space is left for an organ on the south side of the chancel. The church is entered by porches with double doors, at the west end. The style of the fabric is Late Gothic. The roof of the nave is supported by buttresses. The building is lighted by a long clearstory, the whole length of the nave on both sides, and by large east and west windows. The roof of the steeples is tiled with Broseley tiles, and near the middle will be a tall fleche. The church is heated and ventilated by Messrs. Ashwell & Nisbett, of Leicester. Mr. G. Henson, of Wellingborough, was the builder.

RESTORATION OF CHRIST CHURCH, SOWERBY BRIDGE.—Christ Church, Sowerby Bridge, which was partially destroyed by fire a year ago, has just been re-opened after restoration. The nave is now spanned by a new roof, of a higher pitch than the former one, consisting of open tracery work, the panels being moulded-ribbed, and the boarding all of pitch-pine. The span of the nave is 52 ft. The new chancel-roof is similar in character. One improvement in connexion with the re-arrangements has been the opening out by complete arches, fitted with ornamental oak-work, of the organ-chamber into the chancel, this having been entirely walled-up in the old church. The gallery front in the old church was of an out-of-date character, but the new one is lower. At the time of the fire a large portion of the west-end, under the gallery, was sealed off to form a kind of vestibule or anti-church. This space has now been thrown into the nave, and utilised for additional seating accommodation. The staircase formerly in the tower has been abolished, and the space is now occupied by the choir-vestry. A new clergy-vestry has been added to the building on the north side. Hitherto the access to the gallery was confined to one doorway abutting on to a winding staircase, but the place of this is now taken by two staircases of stone on the north and south sides of the tower. The old heating apparatus is now entirely replaced by a new system, hot water at low pressure being used for that purpose. The stained glass windows damaged by the fire have all been reinstated, and a new stained glass window by J. Edmondson, Manchester, has also been placed at the south end of the nave, under the gallery. The flagged flooring is now superseded by ornamental red tiles. The new pulpit of white Bath stone has been built by Messrs. J. Charnock & Son according to the designs and models of Mr. W. Clement Williams, of Halifax. The following firms have been the principal contractors:—Messrs. J. Turner & Sons, Warley; joiners, J. Charnock & Sons, Halifax; plumber, T. Boocock, Halifax; slater, T. Dyson, Sowerby Bridge; painter, Mrs. Mallinson, Sowerby Bridge; tiling, Maw & Son, Stoke-on-Trent; gas fitters, Stott & Son, Oldham. The total outlay is estimated at 5,000l. The architects were Messrs. Horsfall & Williams, of Halifax.

FOREIGN AND COLONIAL.

FRANCE.—The first stone of a new Hôtel de Ville at Ivry has been laid. The architect is M. Adrien Chancel, who obtained the commission as the result of a competition. The building, which will cost 800,000 francs, will be erected in what was formerly the park of Hardsou Mansard the architect. At Saigon, in Cochinchina, a competition has been opened for a theatre, to cost 700,000 francs. M. Coulon, the sculptor, has completed the statue of Tuetodre de Banville, intended for the poet native town, Moulins. The work, which is to figure in the next Salon, represents the poet seated in an armchair and draped with a long robe like a dressing-gown. In accordance with a recommendation of the Commission des Monuments Historiques, various repairs are shortly to be undertaken to the Maison Carrée, at Nîmes, the interior of which is to be repaved, ornamented with mosaics, and is to receive the collection of ancient coins at present deposited at the Mairie. The Champ de Mars Salon will be open this year from April 25 to June 30. There is talk of erecting the Rue Bonaparte, near the École des Beaux-Arts, a home for the Académie de Médecine, at present very inconveniently installed in the Rue des Saints-Pères. The Minister of Public Instruction and Fine Arts has commissioned M. Achille Jacquemont, engraver, to produce a portrait of the new President of the Republic, M. Faure, while M. Chaplain has been commissioned to execute his bust as a medallion, and M. Saint-Marceaux to produce a sculpture. The jury in the competition for erecting a monument to Watteau in the garden of the Luxembourg, has decided in favour of the design by M. Henri Gauquie (sculptor) and M. Guillaume (architect). On the centre of a balustrade forming a semi-circle is a column bearing the bust of Watteau, a young woman in the costume of the eighteenth century, seated on the balustrade, offering a bouquet of flowers to the painter. The monument as a whole will have a very good decorative effect. The death is announced of M. Sidney Dunnet, member of the Société Centrale des Architectes, an architect-in-chief to the Nord Railway Company, who received last year the decoration of the Légion d'Honneur for his excellent works at the railway stations of Lille, Roubaix, and Paris. We have record the death of M. Eugène Fichel, the painter, at the age of sixty-nine. He entered at a very early age into the atelier of Delacroix, and commenced his career as a historical painter, but soon abandoned this for *genre* subjects, in which he was very successful, and received frequent medals at the annual Salons. He exhibited regularly up to last year. Among his best works are "Cabaret Ramponneau," "Partie des Cartes," "Diderot le Neveu de Rameau," "Le Forge de Louis XVI," &c. Madame Fichel, his widow, has also been frequent exhibitor under the name of "Jean Samson."

MISCELLANEOUS.

NEW BOLT FOR STABLE DOORS.—This is a variation of the Paragon bolt for special application to stable doors. Two locking-plates are used, the larger of these is fixed on the outside of the door (fig. 1), and the smaller on the inside, but in



FIG. 1.

inverted position (fig. 2). The handles of the bolt engage both locking-plates, and as the handle on the outside of the door is heavier than that on the inner side, the natural tendency is to throw



FIG. 2.

handles into the locking-slots. The bolt is arranged that no daylight is visible through the door where it is fixed, and the fact of the handles of the bolt being flush prevents the horse from using his teeth, and the effect of using his tongue would be to push the handles more firmly into the locking-slots, while there is no projection to catch in the harness or whereby he could damage his skin rubbing against the door. The bolt is made by

iron and brass, so as to be suited for all, including best, classes of stable-work. The Paragon Bolt indicate are the makers and patentees.

COMPO-BOARD.—Compo-board is the name given a new description of lining for buildings which has been brought out in the United States, and a description of which appears in the *Builder and Architect*. It is as its name implies, a composite material, being made from thin strips of wood placed between two sheets of heavy straw. An ordinary cement is used for uniting the strips, and the whole is subjected to heavy pressure. It is said to be wonderfully strong and elastic, so much so that an 18 ft. board can be bent round its ends touch. It forms a cleaner, warmer, and drier wall than is obtained by plaster, it adds to the strength of the structure, is air-tight and imp-proof, and, finally, is not more expensive in position than good plastering.

GAS V. ELECTRICITY.—In Copenhagen an experiment has been carried out for lighting the streets with incandescent gas on the Auer principle, but it appears to be the commercial difficulty of lighting the quays with gas. Automatic meters have been tried without success. On the other hand, the municipal Central Electric Lighting Station is extending its operation so rapidly that it is expected, at the end of the present year, that the full original capacity of the plant, which is 27,000 lamps, will have been reached. Additions to the station are already in contemplation.

BATH MASTER BUILDERS' ASSOCIATION.—The annual dinner of the Bath Master Builders' Association was held on the 4th inst., under the presidency of Mr. Stephen Ambrose. "The Trade and Commerce of Bath" was proposed by Mr. George H. Perrin, of Bristol, and responded to by Mr. Turner. The toast of "The Bath Master Builders' Association" was proposed by Mr. H. J. Pear, and acknowledged by the President. Mr. G. Ambrose and Mr. E. T. Hatherly replied to kindred Associations, and Mr. Bligh Bond responded on behalf of the visitors.

REDEMPTION, ST. MARY'S CHURCH, RYE, KENT.—New rededication in memory of the late vicar, the Rev. V. D. T. Gladstone, was dedicated at the parish church of St. Mary, Rye, on the 5th inst. The edifice is constructed of English oak, and has been designed by Mr. Parsons, architect. It consists in main of three distinct gabled panels resting upon broad super altar. The panels themselves each contain a sculptured figure. The work has been carried out by Messrs. Harry Hems & Sons, of Exeter.

PARTNERSHIP.—Mr. R. C. Whitelegg, architect, Manchester, has taken into partnership Mr. R. E. Whitaker. They will practise conjointly at Mr. Whitelegg's present address in Albert-square, Manchester.

SANITARY INSPECTORSHIP.—Mr. W. L. Bradley, Sanitary Inspector to the Guildford Corporation, has been appointed to a similar position under the Cambridge Urban District Council.

WINDOW, ST. PANCRA'S CHURCH, EXETER.—The church, one of the oldest in Exeter, recently restored by Mr. J. L. Pearson, R.A., has just been enriched by the insertion of stained glass in the east window. The glass depicts Our Lord, in the centre, crucified, with a pelican on the summit of the cross, and a fruitful vine springing at its feet. The two side-lights consist of figures of the boy Panoras, and St. Boniface in episcopal garb, standing in Early canopied niches. The work was designed and executed by Percy Bacon & Bros., of London, under the supervision of Mr. Pearson.

LEGAL.

BUILDING-OWNER AND HIS PLANS.—The case of Park v. the Fulwood Local Board came before Justice Wills and Wright, sitting as a Divisional Court of Queen's Bench on the 7th inst., being an application, on the part of a building-owner for a mandamus to approve plans he had submitted for a building on his land. He stated his affidavit that in 1887, being desirous of laying out a building estate, consisting of a row of houses with a line, with gardens in front, he had submitted plans to the Local Board showing that none were to be nearer than 21 ft. to the pavement. He then sold two plots, inserting a covenant in the deeds that the purchasers should not bring their houses nearer than 21 ft. to the pavement, but they then, in their houses further back in order to allow of a garden space in front. Before he sold the two plots the applicant had sold a portion to the owner of the plots, and the purchaser proposed to build a small house upon that plot of land, coming to 21 ft. of the building-line, and the applicant presented plans to the Local Board, who had refused approval of them on the ground that they did not conform to the line formed by the two purchasers who had put their garden in front. The Court granted a rule nisi.

Mr. Banks appeared in support of the rule.

WASSON & FAWELL v. PAWSON & LEAF, LIMITED.

This motion came before Mr. Justice North, and was to obtain an injunction to restrain the defendants from erecting a building having stages in Carter Lane and Dean's Court,

which, it was alleged, would interfere with the light and air of a window and fan-light on the ground-floor, and a window on the first floor of plaintiff's premises, No. 4, St. Paul's Churchyard. It was contended that the obstruction was too far distant, being 80 ft. to 90 ft. away, the building rising 10 ft. 3 in. in one part, and 42 ft. higher than the old buildings in another position.

Counsel for the plaintiffs were Mr. Swinlen Eady, Q.C., and Mr. W. F. Hamilton, instructed by Messrs. White & Leonard.

Counsel for the defendants were Mr. Cozens-Hardy, Q.C., and Mr. Ford, instructed by Messrs. Phelps, Sedgwick, & Biddle.

The surveyors engaged for the defendants were Mr. E. A. Gruning, Mr. H. H. Collins, Mr. F. Chambers, of Messrs. Chambers & Son; Mr. Herbert Ford, Mr. Hudson, of Messrs. Hudson & Booth; and Mr. Robert Vigers. The surveyors for the plaintiffs were Professor Banister Fletcher and Mr. J. Douglass Matthews.

Injunction granted with costs.

A DISTRICT SURVEYOR AND HIS FEES.—IMPORTANT POINT.

MR. MORTON SMITH on the 12th inst., moved in a Divisional Court of Queen's Bench, composed of Justices Wills and Wright, on behalf of the District Surveyor of West Hackney for a rule in the nature of a mandamus to Mr. Lane, the Metropolitan Police Magistrate of North London, to state a case to raise the question as to who was liable for the District Surveyor's fees where a building is nearly completed by the original builder, and, on his failing, quite completed by another.

The facts were shortly as follows:—Notice was given by a Mr. James, a builder, for the building of fourteen houses, and he proceeded to build them, and had roofed in all the principal buildings, leaving only certain offices not covered in, when he became a bankrupt. In February of last year a Mr. Prout, another builder, gave notice to complete the buildings under the Metropolitan Building Act, 1855, which enact that "Before any building shall be commenced notice shall be given to the District Surveyor, and if the building shall be interrupted for more than three months, then before the building is recommenced notice is to be given that it is to be resumed, so that the District Surveyor may watch the building and see that the Building Acts are complied with."

Mr. Prout finished the houses by covering in the subsidiary buildings, and then the District Surveyor applied for his fees, as provided for in the schedule to the Act. Mr. Prout contended that the fees ought to have been recovered from Mr. James, or proved under his bankruptcy, under Section 51 of the Act, as to fees of District Surveyors, which provides that a month after the building is covered in the District Surveyor shall be entitled to receive the fees from the builder employed in erecting such building, as doing the work. The Surveyor, not receiving his fees, summoned Mr. Prout before the magistrate, but he, after referring to the case of *Tubb v. Good* (5 Queen's Bench Law Reports, 443), thought that the claim could not be supported, dismissed the summons, and refused to state a case.

Mr. Smith contended that the case the magistrate relied upon was disaffected from the present case. In the case of *Tubb v. Good* the buildings had been completely roofed in and the District Surveyor had tried to get his fees from the owner when the buildings were fully finished, but in the case in question at the time the first builder became bankrupt the buildings were not completed and not covered in, and so the second builder was liable for the fees.

The Court granted a rule nisi.

MEETINGS.

FRIDAY, FEBRUARY 15.
Architectural Association.—Mr. H. H. Statham on "The Bridges of London Architecturally Considered." With Illustrations. 7.30 p.m.

Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—Mr. J. Castell-Evans on "Physics and Chemistry: Water." IV. 8 p.m.

Institution of Junior Engineers.—Mr. Walter J. Fryer on "The Practical Application of Alternating-Current Motors." 8 p.m.

SATURDAY, FEBRUARY 16.
Edinburgh Architectural Association.—(1) Visit to 20, Moray-place; (2) Visit to 25, Learmonth-terrace.
Queen's College, Cork.—Mr. Arthur Hill on the "History of Architecture." XI. 3 p.m.
Architectural Association.—Second spring visit, to the new Pavilion Music Hall, Whitechapel-road. Mr. E. A. Runtz, architect. 3 p.m.

SUNDAY, FEBRUARY 17.
South Place Institute.—Mr. George Dew on "Sixty Years of Industrial Progress in the London Building Trades." 4 p.m.

MONDAY, FEBRUARY 18.
Surveyors' Institution.—Mr. Arthur Pain, C.E., on "Light Railways." 7 p.m.
Royal Academy (Lectures on Sculpture).—Mr. A. S. Murray on "The Schools of the Late Sixth and Early Fifth Century B.C." I. 4 p.m.

Victoria Institute.—4.30 p.m.

Architectural Association.—Second spring visit, to the new Pavilion Music Hall, Whitechapel-road. Mr. E. A. Runtz, architect. 3 p.m.

TUESDAY, FEBRUARY 19.
Royal Academy (Lectures on Sculpture).—Mr. C. Rutter and Mr. E. Smart on "Plant for the Extraction of Gold by the Cyanide Process." 8 p.m.

Sanitary Institute (Lectures for Sanitary Officers on

Physics and Chemistry).—Mr. J. Castell-Evans on "The Chemistry of Fuel and Combustion." V. 8 p.m.
Glasgow Architectural Association.—Mr. S. Henbest Capper, M.A., on "The Monks and their Abbeys." 8 p.m.

WEDNESDAY, FEBRUARY 20.
Architectural Association Camera Club.—Papers on "Sketching v. Photography." 8 p.m.

Builders' Foremen and Clerks of Works' Institution.—Ordinary meeting of the members. 8 p.m.

Liverpool Engineering Society.—8 p.m.

Carlisle Architectural, Engineering, and Surveying Association.—Mr. W. Pogson on "Iron Roofs." 8 p.m.

North Western Architectural Association.—Mr. R. B. Dick on "Architectural Sketching." 7.30 p.m.

THURSDAY, FEBRUARY 21.
Royal Academy (Lectures on Sculpture).—Mr. A. S. Murray on "The Schools of the Late Sixth and Early Fifth Century B.C." II. 4 p.m.

Society of Antiquaries.—8.30 p.m.

Institution of Electrical Engineers. (No. 15, John-street, Adelphi).—Dr. John Hopkinson, M.A., F.R.S.; Past President, on "Propagation of Magnetism in Iron." Illustrated by Experiments. 8 p.m.

FRIDAY, FEBRUARY 22.
Institution of Civil Engineers (Students' Meeting).—Mr. William G. Wales on "Calissons and Gates for closing Locks and Dock Entrances." 8 p.m.

Royal Institution.—Professor A. Schuster on "Atmospheric Electricity." 9 p.m.

Sanitary Institute (Lectures for Sanitary Officers on Physics and Chemistry).—Mr. J. Castell-Evans on "Sanitary Chemistry." VI. 8 p.m.

SATURDAY, FEBRUARY 23.
Builders' Foremen and Clerks of Works' Institution.—Annual Dinner, The King's Hall, Holborn Restaurant. 6.30 p.m.

Queen's College, Cork.—Mr. Arthur Hill on the "History of Architecture." XII. 3 p.m.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

405.—**MACHINES FOR SHEET METAL LATHING.** *G. Hayes.*—This is a machine for cutting a lathe through a sheet of metal at intervals throughout its length, with an arrangement for corrugating and at the same time expanding the slits or openings. By suitable gearing a pair of rolls are revolved, these rolls having their outer surfaces formed in a system of annular ridges and hollows. The sheet is corrugated by compressing it at intervals between breadth and pressing out of plane the intervening portions, thus expanding the openings and converting each sheet into finished lathing.

5073.—**MANHOLE DOORS.** *A. Lambie.*—This patent relates to the opening and closing of manhole doors by eccentric acting organs, and is effected by a series of bolts or pins projecting from the outer surface of door, each bolt or pin being actuated by an arm or eyebolt mounted by an eye at one end and tightened by a screw nut. At the end of each arm, which is at right-angles to its screw bolt, is fixed an eccentrically-mounted cam. On turning the eccentrics the door is raised or lowered as desired.

4377.—**FIREPROOF FLOORS.** *R. Astley.*—For protecting the underside of joists and girders against heat a number of L-shaped tiles of freestone, with dovetailed grooves for receiving the plaster, are placed on each side of the joists and girders, the space being filled up with concrete.

4490.—**CHIMNEY-TOPS AND VENTILATORS.** *G. Houdon and another.*—An apparatus for preventing the down-draught and increasing the up-draught of the chimney, consisting of a tube surmounted by a head composed of four truncated cones so joined as to form two heads in continuity. A number of mouths are placed in the space formed by the junction of the two heads, and arranged to catch the passing current of air and cause an up-draught. A cone for preventing down draught is secured to the head by suitable stays.

6077.—**HINGES.** *Tonks, Limited.*—Reels or tubes of iron are formed with flanges on their ends, and with an axial hole to fit upon the pin of finished hinge. The reels are then threaded upon the axis, and placed in the mould in which the flap or knuckles are cast. During this operation the metal runs round enclosing the reels, and connects the whole firmly together.

15,584.—**NAILS.** *H. E. Holloway.*—Consists in making a recess in either side of all flat nails for the purpose of gaining extra hold, also diamond points are formed for easier driving of same.

23,046.—**WINDOWS, CHEVAL GLASSES, &c.** *R. Latham.*—This is a method of reversing windows, also applicable to mounted mirrors. The pivot has a disc with bevelled edges fitted to the side of the glass. A perforated plate having corresponding bevelled edges is fixed into the frame. One fits into the other, and a thumbscrew is employed to clamp the two together.

23,589.—**BRUSHES.** *W. P. Thompson.*—Consists in keeping the raw cocoa fibres in water, and an infusion of hot water and soda. After washing and wringing up in bundles they are boiled in hot water and dried, then trimmed and made ready to be used for paint and other brushes.

NEW APPLICATIONS FOR LETTERS PATENT.

JANUARY 29.—2,035, H. Cordes, Boat Nails.—2,038, H. Cordes, Speaking-tubes.—2,049, F. King, Door-silencer.—2,052, H. Brierley, Sanitary Cisterns.

JANUARY 30.—2,082, F. Robertson, Windows.—2,090, A. McIntyre, Opening Window.—2,094, G. Love and E. McIntyre, Safety-lamp for Kitchens.—2,106, S. B. Salter, Water-closet Pans or Basins.

JANUARY 31.—2,174—J. Brierley, Bolt-end Cutting-tool.—2,184, G. Butt, Picture Frame Moulding.—2,201, H. Mole and others, Manufacture of Crucibles, Fire-clay, Refractory and Non-conducting Bricks and Blocks, &c.

FEBRUARY 1.—2,230, J. Parker, Bell-handles and Bell-pushes.—2,244, W. Wall, Sewer-ventilators.—2,253, J. Whitehead, Pipe Soldering.—2,258, S. Bass, Windows.—2,283, G. Ellis and others, Tiling of Roofs, &c.

—2,300, T. Shaw, Closet Seats.

FEBRUARY 2.—2,342, F. Harper, Nut- and Screw-drivers.—2,354, T. Jeffrey, Door or Port-hole Rods.—2,359, J. Hall, Kilns.—2,365, F. Lawson, Architects' Set Squares.

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24,554, J. Davidson, Securing Door Knobs.—24,789, S. Dalziel and J. Oliver, Alarms for use with Doors, Windows, &c.—24,745, H. Enoch, Flushing and other Cisterns.—24,746, H. Wood, Bricks.—24,747, W. Laxun, Soil-pipe Exhaust to draw the sewer-gas out of ventilating-pipe from drains and diffuse it.—595, C. Rogers, Closet-pans and Water-closet Ventilation.—722, R. Matthews and others, Drain-

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J. McCabe £5,075 15 4
W. F. Chadwick 6,392 1 10
Thos. Hood 5,854 18 6
James Keating & Sons 5,235 1 0
tree, Liverpool 5,250 0 0
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Framery—Walter Allen, Wooler 203 13 0
Slating—Thomas Smart, Wooler 47 0 0
Plumbing—Wilkin & Dickman, Alnwick 37 0 0
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Painting—John Percy, Alnwick 33 5 0
Slating—John N. Reavell, Alnwick 31 17 6
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The Builder.

VOL. LXVIII. No. 2716.

FEBRUARY 23 1895.

ILLUSTRATIONS.

Sta. Maria Delle Grazie, Milan	Single-Page Ink Photo.
Interior of Sta. Maria Della Salute, Venice	Single-Page Ink Photo.
Church of the Miracoli, Venice; Detail of Upper Portion of Façade	Single-Page Ink Photo.
Façade of Municipal Buildings, Brescia	Single-Page Ink Photo.
Conservatory, 39, Chesham-place, S.W.—Professor Aitchison, A.R.A., Architect	Single-Page Ink Photo.
Theatre Royal, Newcastle.—Messrs. W. Emden and W. Lister Newcombe, Joint Architects	Three Single-Page Ink-Photo's.

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Plan of the Fort of Saalburg	Page 135	Plan of Sta. Maria delle Grazie, Milan	Page 144
Diagram illustrating paper on "The Bridges of London"	Pages 141, 142, 143, 146, 147	Plan, and Detail of Railing, Chesham Place	" 145
		Diagram, "Duplex" Chimney-pot	" 151

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The Roman Fort of Saalburg.



FROM any point in the fertile plain around Frankfurt-on-the-Maine the range of the Taunus Hills is in fine weather always visible, forming a dark and well-defined wall to the valley of the Rhine and the Maine. As they are approached yet nearer, their outlines take a more defined shape, and the thick woods of pine and oak and beech with which they are covered are seen extending in level masses, now gloomy under passing clouds, now gleaming brightly when the sun breaks out. The pointed summit of the Altkönig, above the castled heights of Falkenstein, is, though not the highest of the range, the most conspicuous, but to east and west of it the hills pass out of sight, one varying but continuous mass. There are few Englishmen who have set foot on the Continent, who have not at one time noticed these hills; it is less well-known, however, that along this range runs in yet clearly-defined lines the boundary-wall, the Pfahlgraben, the *limes imperii* of the Romans, the wall of defence which stretched from the Rhine to the Danube, and was intended to protect the fertile valley of the Rhine against the tribes of Germany. Nowhere at the present day can one pass through the woods which so thickly clothe these hills without, on approaching their summit, crossing the plainly visible remnant of the defence—a low bank some two or three yards in breadth. Eighteen hundred years ago it was defended by a ditch and stakes; along it were placed at intervals watch-towers and forts: from the former the Roman soldiers could look northwards over wood and hill for the approach of the enemy. And even now if one ascends the wooden tower on the Fröhlichemann, as one height is called, it is easy to picture the scene, though centuries have passed away since the Roman occupation; for the eye yet wanders over thick woods rising smoothly towards the summits of the hills, and breaking abruptly into patches of cultivated land when the spurs touch on lower ground.

Between the Herzberg on the west, and

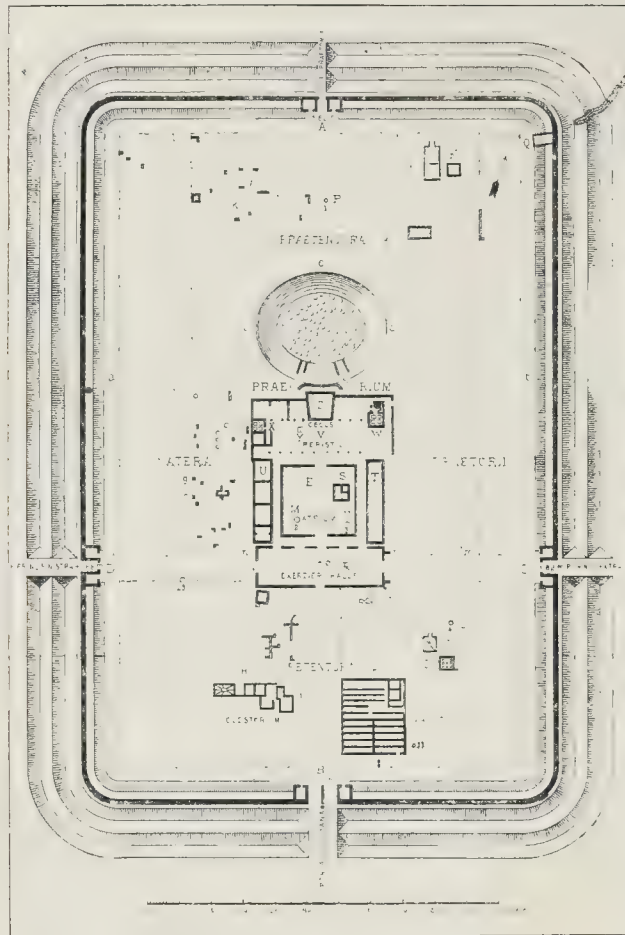
the Gickelsberg on the east, there is visible a noticeable lowering in the chain of hills. This was the weakest spot in this natural line of defence, it was the easiest pass between the thickly-wooded valleys which extended to the Lahn and the fruitful fields by the Main and the Nidda; it was the spot which the Roman generals selected for the largest and strongest of their forts in this part of Europe. It has been known in modern times as Saalburg. Of its history in the times when the Romans held a precarious dominion over these hills and valleys there are no written records, but from the coins, soldiers' weapons and ornaments, votive altars, and other remains which have been discovered during the course of the excavations which have taken place here and along the Pfahlgraben, it is possible dimly to follow its fortunes. This history, necessarily meagre and vague, is briefly stated in Colonel von Cohausen's and Herr Jacob's excellent little work "Das Römercastell Saalburg," from which the plan accompanying this article is by permission taken.

It is known that Drusus in 11 B.C. built a fortified place (*præsidium*) on the Taunus Mountains, but no traces of his legion have been discovered in or near Saalburg, and it has been surmised that the fort was erected in the reign of Domitian towards the end of the first century after Christ. But as coins of predecessors of this Emperor have been found in and near Saalburg—few, no doubt, but still some—it is perhaps rash to endeavour to fix any particular time as that at which Saalburg began to be a fortified Roman station. At the best it is guesswork only, nor is the actual date of any particular importance. There is no doubt about the broad fact that for years it was an important fort, and that it remained in the hands of the Romans until the end of the second century after Christ, with some uncertain intervals during which it fell into the possession of the Germans. The latest Roman coins which have been found are those of Claudius Gothicus, whose short reign of two years lasted from A.D. 268 to A.D. 270. By the beginning of the third century moss and underwood were doubtless rapidly hiding this stronghold from view, and soon its site would be indistinguishable from the rest of the vast woodlands by which it was surrounded. It became a mere stone quarry from which peasants could fetch the

materials for their cottages; while in later years the high road from Homburg to Usingen, which passes a few yards from the fort and cuts in two the Roman road which led straight down to the Rhine, was largely made from the stone which the Romans had used. Till the end of the eighteenth century, however, the camp and its neighbourhood remained unnoticed. In 1780 it attracted the attention of Elias Neuhoof, who visited and also wrote of it. At the beginning of the present century Roman relics began to be collected and placed in the Castle of Homburg, and in 1818 an order was issued that no stone was to be removed from Saalburg. This was, in fact, the commencement of a period during which the attention of archaeologists and historical students has been given to the site of the fort. From 1830 Homburg was not only a health resort but a gambling place; and great crowds were drawn thither, and from among them many persons from all parts of Europe visited Saalburg. The local authorities received substantial aid towards the exploration and excavation of the fort and its neighbourhood from the director of the Kursaal and gaming-tables; so that the main outlines of the fort were fully discovered. From that time the work has never been allowed to flag; sometimes it has been carried on by private subscriptions, sometimes by grants of public money. Thus in 1875 a sum of 10,200 marks was granted towards the excavations, and further subsidies have been allotted when necessary. The contrast between the steady and careful energy with which this work has been carried on for years, the judicious manner in which it has been supported by the funds of the nation, the useful and intelligent interest which has been taken in it at all times by the reigning house of Germany, and by a soldier so renowned as the late Field Marshal Moltke, and the absolute denial of all national support to the exploration of Roman remains in this country, is not only marked, but disgraceful to us as a people.

Not only indeed has the fort and its neighbourhood been gradually brought to light, but every relic is promptly sent to a special museum at Homburg, where it is properly placed or catalogued.

Of the fort an accurate idea can be obtained from the plan attached to this article, and already referred to. From the general plan of



The Roman Fort of Saalburg.—Plan.

C D	V	Principal.	S	Sacellum—Here the Standards and Portrait of the Emperor were kept.
G G ¹ G ²		Buildings which could be warmed by hot air.	UT	Living and Store Rooms.
I K		Bath House.	XW	Chambers which could be warmed.
M N		Wells.	Y	Sandstone Slabs—Possibly the base for a statue of Victory, some relic of a bronze statue having been found in the immediate vicinity.
P		Well.		
Q		Latrines.		

the site given by the late Col. von Cohausen* it appears that, under the protection of the fort, and to the southward of it, were erected a so-called villa and smaller buildings. The "villa" has been supposed to be the Palace of Caracalla, who was much in the Rhine Valley from 211 to 217, but it was the chief of the civil buildings, many of which were probably of so temporary a kind as to have left no trace behind. But a fort which could hold as its normal number from 1,000 to 1,100 men was certain to cause a small town to grow under its shelter, just as in Mediaeval times the citizen built his house under the protection of the Castle. The numerous wells which have been discovered to the south and east of the fort undoubtedly indicate the position of civil dwellings. These wells, as well as others within the bounds of the fort itself are all indicated on

the general plan of the site given in the book; those which were lined with wood and were rectangular in shape being marked by a small square, whilst those which were circular in form and were lined with masonry are distinguished by a circular mark. They vary much in depth. The well at the north end of the fort, which was probably the chief water-supply of the garrison, is 26 metres in depth, whilst some of the others are no more than 7 metres; but, as we have said, those outside the fort are chiefly valuable as evidence of the site of non-military dwellings, which in their turn indicate the importance of the fort itself. In the museum at Homburg the lining, buckets, and apparatus of these wells can be seen, the oak of which they were made being as hard as iron.

Reaching the place by the high road from Homburg, one leaves it a short distance above the inn, and treads the old Roman road, which is now overshadowed by a picturesque avenue of limes. As we approach the principal entrance—the Porta Decumana—the defences outside the wall are plain; firstly an interior ditch immediately under the wall, then a rounded mound, and then an external ditch. It is

only near this gate that this formation of the outer lines is perfect, for it has not been thought necessary elsewhere to clear the ditches from the deposit of centuries, or to restore the earth-wall to its original form. When we have passed inside the gate, the eye is at once attracted by the restored battlement* in the south corner, parallel with the Porta Decumana. But this piece of restoration, though it shows the character of the wall, cannot bring before us the fort as it was. Now, as we stand at this main entrance we see the entire fort 221 metres in length, and 147 in breadth. It lies before us, a well-kept lawn studded with trees, and broken in places by low walls of various forms which rise little above the ground which near the walls of defence slopes up to them somewhat sharply. We see from one end to the other, and from side to side, but the low walks indicate the position of important buildings, and were we standing on this same spot when the place was a military stronghold they would intercept our view. In front but somewhat to the left was the Quæstorium, to the right a large building supposed to have been a magazine: in the centre of the fort the Prætorium would have broken our view, hiding from us the northern portion of the fort with its narrow gateway, the Porta Prætoria—leading to the Pfahlgraben and the sloping hill-side beyond—and we should hardly have seen as we now do the two side gates one third of the distance from the southern ends of the side walls; now mere openings, in former days archways with side towers. The only portion where this general view is now in any way broken is at the eastern side, which is yet in parts hidden by brushwood and earth; but the work of clearance is being so steadily continued that by the end of the summer of 1896, it may reasonably be expected that the whole circuit of the fort will be clearly open to view. The ground plan will then, so to speak, have been laid bare and plain; every foot of the walls will be apparent: within them are the bases of the buildings which we have already mentioned, showing plainly in some instances the elaborate system of heating practised by the Romans. In addition there are the amphitheatre, and the well-planned bath house from which the water ran to the covered latrines in the north-west corner. We thus see in every detail the formation of a Roman fort of the most elaborate kind; not one throughout the Empire was more important than that of Saalburg; and it is plain to us. But yet to-day the pleasant turf, the hardly perceptible walls, the rural quiet, the encircling woods are little like the crowded fort of Roman times, with its upstanding buildings, its numerous troops, the wide open space around the walls, and the *limes imperii* stretching away on either hand. But some little incident, perhaps the discovery of a coin as we pass by, flung away, it may be, by a Roman soldier as the fort was stormed by Germans, or dropped in a conversation with a comrade, may awaken the imagination and enable us to realise the place as a whole and as it was, full of life, in the warm summer days, in the snowy nights, in peace when the soldiers went in and out, and the traders were busy in the civil quarter without the walls, or in war time when, waiting for the approaching barbarians, the Roman soldiers lined the Pfahlgraben, and their shields and spears were seen on the battlements. Yet it is much to have the general plan before us; to be able, standing at any point, to comprehend the whole arrangement of the fort, and then each one may picture it, or people it as he likes, in peace or war, in sunshine or storm.

NOTES.

IN a pamphlet ("Delphika") dealing with certain questions of Delphic antiquities, Dr. Dümmler discusses among other matters the origin of the Lesche at Delphi, and of

* Colonel von Cohausen died at Wiesbaden on Dec. 3, 1894, aged eighty-three. He was a skilled military officer, and a learned and patient archaeologist. Among other military positions which he filled during his long life was that of Chief Engineer at Coblenz. At the time of his death he was a member of the Imperial Commission on the "Limes Imperii." Colonel von Cohausen published works on Caesar's Bridges across the Rhine, the antiquities of the Rhine, and similar subjects, in addition to the more recent and important "Der Römische Grenzwall in Deutschland."

* Restored in 1885.

leschai in general. It has usually been thought that these *leschai* were of comparatively late origin, and were merely convenient places of gathering for casual social purposes, sheltered from sun and rain—"conversation halls," as by a false etymology they were called. Dr. Dümmler, from an examination of classical passages, and specially a recently-discovered inscription, arrives at the original and very interesting conclusion that the *leschai* were originally tribal burial-places, hence places of meeting where the survivors took counsel, and hence in later days places for accidental social gathering. According to this view the *lesche* (*Μεση*) was originally the large rectangular stone laid over the grave, also known as a table (*ῥάπη*); and on one of these in Rhodes is inscribed, "I am the *lesche* of . . ." So long as the dead were buried in the house this would be close to the family hearth, where the family gatherings and the family worship would take place. Later it was removed to a distance, but always within the tribal boundary. The new view is most interesting in relation to the great *Lesche* of Delphi, which Polygnotas decorated with the descent of Odysseus to the lower world—a subject obviously well-fitted to a burial-place.

THE paper read by Mr. Myres at the Hellenic Society on Monday recorded the very useful investigations of himself and Mr. Paton in part of Caria, in tracing and endeavouring to identify the sites of various towns mentioned by Strabo, and thus marking out the lines for future more detailed exploration; but nothing much of architectural interest arose immediately out of it. An archaic Ionic capital was found at Alizettin; remains elsewhere of the walls of tombs, one of which appeared to be intended to be corbelled over in a horizontal arch as in the "Treasury of Atreus," and various other pieces of ancient walling, but nothing of very special interest. We must again recommend that some attention should be given at the Hellenic Society to providing adequate illustrations of papers read. As a rule, papers read at the Hellenic Society are the worst illustrated of any we ever hear. If a map or plan is hung on the wall, it is sure to be so small as to be invisible to the majority of the audience; and the handing of photographs round among the audience is a most exasperating and useless way of illustrating a paper. By the time one of these has been passed to about the sixth person, the lecturer has passed to something else, so that the listener can only study the illustration at the cost of losing the thread of the discourse. A paper bristling with an alternate use of the ancient and modern names of places cannot be followed in any intelligible manner on such a system. Those who read papers at the Hellenic Society ought to produce illustrations in a form in which they can be seen and followed while the paper is being read, and the Council ought to make a point of this.

IN the course of the report presented by the Board of Trade Inspector last week upon the railway disaster at Chelford, some practical suggestions are made as to the precautions necessary for averting similar catastrophes in the future. It is recognised that the suspension of shunting operations while passenger trains are passing, is next to impossible in practice, although it may be desirable in theory; but the inspector points out that the rules of the railway companies are open to amendment. However unforeseen and unusual the circumstances under which a railway accident occurs, the fact that the accident happened proves the possibility of a similar result at anytime under similar conditions. The prime cause of the disaster in this case was the exceptionally high wind, and the associated railway companies are strongly recommended to lay down regulations in their rule-books to be

observed during the prevalence of high winds. It is suggested that at such times all wagons should be kept attached to the engine when being set back on to their trains; or that, where this would lead to unreasonable delay, all wagons shunted back loose should have the brake pinned down as soon as they come to a stand, no matter what may be the gradient of the line at that particular place. It is also recommended that all wagons should be fitted with a brake handle on both sides, "instead of, as in the majority of cases at present, upon one side only." It seems astonishing that such a recommendation should be necessary; considering the way wagons are worked in shunting, it ought to have been obvious to railway managers long ago, that there ought to be a brake available on both sides for checking wagons on a gradient.

IT is to be hoped that those who are interested in the water-supply question for London have duly taken note of Mr. Bryce's reply to a question put in the House of Commons on Monday in regard to the provision of means for water supply to houses in the event of the mains being frozen up. It was stated in Mr. Bryce's reply that "the Companies under their Acts were expressly protected from liability in respect of a failure of direct supply by reason of frost." That, we venture to think, fairly caps the situation. It is not sufficient that the supply of a necessary of life and health to the largest city in the world should be in the hands of trading companies who find every excuse for cutting down their supply or charging extra for it for the benefit of their shareholders; but if the supply of water is stopped by natural causes, the loss is to fall not on those who undertook to supply the water, but on their customers, who have, of course, to pay their rates all the same! It would be difficult to imagine a more monstrous and iniquitous piece of legislation.

THERE is no doubt at all that much of the discomfort which people both in town and country suffer by the loss of the water-supply owing to the freezing of water-pipes, can be prevented by very simple precautions when the pipes are first put in. In some cases they may be placed in less-exposed places, in others they may be placed at a greater depth underground, in many instances they can be covered with felting or protected by various methods of a simple character. Even where there is no permanent protection, it is often possible to keep the water-supply intact by temporary means. Many persons must be familiar with a common country sight in winter time, namely, the farmer's pump snugly enveloped in bands of hay or straw. This is only an indication of what may be done by very simple means to prevent very great discomfort. There is no reason whatever why in towns the same principle might not be acted on by the use of coverings for outside pipes, which could be used in hard weather in winter, just as sun-blinds are used in hot weather in summer. At times, even the best precautions may not always be successful, but at present the English householder really takes no care to protect his water-supply. He generally bears the calamity very philosophically, but in many instances he might prevent it altogether, and so need not have to bear this household trouble on his shoulders.

THE practice of putting inscriptions on bells is not, as has been often thought, exclusively a modern one. Most museums contain specimens of ancient bells. Notably at Naples, a number are collected that were found at Pompeii and Herculaneum, but until quite lately there was no specimen extant of a bell with an inscription. At Tarraco, in Spain, when the workmen were quarrying stone for the works in the new harbour, they found among numerous other

ancient remains a small bronze bell with the iron clapper still inside it. The inscription notes that it was used "in the sacred rites of Augustus," i.e., for some imperial cultus; moreover—an important point—we learn from it a new Latin word for *bell*. Classical Latin knows only the word *lintinnabulum*, *campana* and *campanula* do not appear till the seventh and eighth century, and in Christian writers, these being obviously bells used to call the distant dwellers in *fields* to worship. In the inscription the bell is called *cacabulus*, from its shape like the *cacabus*, a cooking-pot. The inscription goes on to say that the bell was pulled by a nuntius junior, some kind of temple attendant. The word *cacabulus* survives in the Spanish *cascabel*. The inscribed bell has been bought for the museum at Tarragona.

THE collection of small paintings by Mr. Alfred East, at the Society of Arts Rooms, illustrating effects of English landscape "from Dawn to Moonrise," is one of the most charming exhibitions which has been seen in the gallery for some time. There are one or two, such as "Grey and Gold, a Gloucestershire landscape" (21), which are rather tricks of effect, but the majority are solid painting, and many may be named (Nos. 9, 14, 16, 19, for instance) which are exceptionally successful as representations of effects of light and atmosphere very difficult to realise in painting, and are full of poetic feeling. Everyone interested in landscape art should look at the collection.

IT is amusing to note that on the occasion of the reading of a paper by an old member of the Architectural Association who happens to be also the editor of this journal, all the other architectural journals, which usually send representatives to the meetings of the Association, formally absented themselves. Whom are they supposed to punish by these tactics? Possibly their own readers, who may think they have a right to expect some report of a paper which was considered by the meeting as an important one; certainly not the reader of the paper, who, they may take it on the best authority, is entirely indifferent whether his name appears in their columns or not, and would not have even been aware of their detection had not his attention been drawn to it.

THE ADVANCEMENT OF ARCHITECTURE.*

BY PROFESSOR AITCHISON, A.R.A.

IN this lecture I shall speak of the emotions raised in me by the buildings I have seen, and then try to explain, if I can, why such emotions were raised. These emotions must to some extent be classed according to the conditions under which the buildings were seen. Those buildings that existed in my native town, London, when I first began to notice architecture, those that have been built since, and had therefore the element of freshness about them, besides their intrinsic merits, and those that I saw in foreign countries for the first time, and were both new and strange to me. In my younger days books were scarce, few libraries were open to the public, I may say none, for the few public libraries that existed were hedged round with difficulties for consulting them, and with annoying restrictions, while photographs did not exist. It is perhaps necessary to say that I was brought up in the Classical school of the Renaissance; that most of the elder architects whose opinion I heard, looked on Gothic in the same light as Vasari, it was to them "the tasteless style," though a few of them had tried their hand at it, and when the first Gothic design for the gold medal was exhibited at the Royal Academy, I heard several of the elder architects say that the Academy had sunk low indeed when it admitted Gothic designs in competition.

I think I first visited Paris in 1851; on reaching Havre I was much struck with the size and architectural pretensions of the houses there, as

* Being the fourth Royal Academy Lecture on Architecture this Session. Delivered on Thursday evening, February 7, 1895.

well as with their brightness, and on my way I saw Rouen, and then the sights of Paris. In January, 1853, I left for the grand tour, brimful of the eloquence of Mr. Ruskin. At Paris I was most struck by Mansart's Invalides, Perrault's facade of the Louvre, and Servandoni's St. Sulpice. I touched at Genoa, and admired the size and grandeur of the palaces, and was astonished at finding whole streets of them, some with hanging gardens. I next went to Leghorn, and thence to Pisa. I could not share Mr. Ruskin's admiration for the outside of Pisa Cathedral, but the inside seemed to me so original and striking that I made some water-colour sketches of it; thence I went to Civita Vecchia and Rome. As a boy I had taken a hatred to the Romans; want of judgment had prevented my seeing that success in nations is the great proof of their virtue and wisdom, and probably I had read bad or partisan histories. At any rate I hated them for their ingratitude towards their own great men, for their greed of power, their avarice, their want of generosity towards the vanquished, and their apparent monotonous success, and I crushed with pleasure the mouldering remains of the cruel giant city under my heel. I merely mention this to show that my mental condition was not favourable to the admiration of the ruins. The enormous height of the Colosseum, when one stood on the highest seat of that vast amphitheatre, impressed the mind more strongly than anything I have seen since, except looking down from the top of the Great Pyramid at Gizeh; but the reflection that the vast Flavian amphitheatre was raised to amuse the idle with the sight of men butchering one another, or of helpless wretches being torn to pieces by wild beasts, was not calculated to raise one's feelings of love or respect for the nation that had built it, and had perished. I then saw there that chief wonder of internal effect, the Pantheon; doubtless the size, fine proportions, and the artistic devices of the interior contribute something to the sublime effect, but the main cause is the single source of light being from above, and coming through the eye in the dome. About this I think there can be no doubt, as I have since seen a large modern church lit in the same way, which, though smaller and wholly without the architectural merits and lovely materials of the Pantheon, produced an analogous effect. On your first visit to Rome, you come from looking at a rather heavy, squat, circular building with a depressed dome, on to which a tolerably good portico has been clumsily attached, and on entering are thunderstruck by the novelty of effect, and the calm sublimity of the light coming in one mass from the top and casting deep blue shadows on the coffered ceiling. You have seen nothing like it before, and will see nothing like it again; unless you visit India. It is one of those first impressions that you never lose, and it is quite worth a journey to Rome to experience. I must tell you that I have never seen Syria, Persia, India, nor the far East. Fergusson, in his Indian architecture and in his Parthenon, gives the Cave temple at Karli as the perfection of lighting; this is lit by a vast semi-circular window in the front. He says, "The effect is magical, and no mode of lighting which is to be seen anywhere equals it in scenic perfection." I should think, however, that no sunlight west of Greece would be strong enough to produce such an effect. Fergusson said of the Pantheon, "In simple grandeur it is as yet unequalled."

Now we are on the subject of lighting, I may as well say that something like the Karli cave lighting was adopted in one of the mosques at Cairo; the plan of the mosque is a cross, formed by a nave and transept, and is not lit like a cathedral by a lantern at the junction, but by the simple plan of leaving a courtyard there, and as the niche (Mihrab) should be on the meridian of Mecca, which at Cairo is nearly south-east, that part of the mosque is mainly lit by reflection: after the Pantheon, it is one of the most striking interiors I have seen. The architecture is almost Greek in its simplicity, and that part where service is performed consists of a plain chamber, vaulted in masonry, with a pointed vault; a deep band of inscription below the springing of the vault is its only ornament. The mosque was built between 1356-60, at the expense of the Mamluk Sultan Hassan: it is looked upon as the finest specimen of Moslem architecture in Cairo. The piece of the nave where service is performed is said to be 90 ft. long, 69 ft. wide, and 90 ft. high to the crown. I could not say after the lapse of time between the visits, which was the finer, the mosque of Sultan Hassan or that of Sta. Sophia. You all know that Sta.

Sophia was built for a Christian church by the Emperor Justinian, a Bulgarian peasant, between 532-7 A.D., after the original basilica had been burnt down. It was built from a model prepared by Anthemius of Tralles, with whom Isidore of Miletus was joined during its construction. By an artistic device, the main entrance to the mosque is through the low, dimly-lighted, narrow narthex, which acts on the eye as an olive does on the palate before tasting fine wine—the light and vastness of the mosque is brought out by the contrast. Nothing I have seen looks so vast; the dome seems to float over your head, as Milton said, "pendant by subtle magic." And the light, which is abundant, comes through the aisles and through the galleries, into the nave, as well as from many windows at a high level. The main shapes, too, are so fine, peculiar, and unusual, that they form another source of surprise and admiration, each end of the church being roofed by a half-dome, out of which smaller half-domes are recessed. The two at each end stand on arcades forming apses on the floor, and at the east end the third is the main apse. The walls up to the cornice are lined with slabs of lovely marbles. The shafts of the columns are mainly carved in white marble, mostly of the pattern of some silver capitals Constantine had used, and the spandrels of the arcades are enriched with carving or *piedra dura*, while above the cornice are coloured mosaic patterns, angels and cherubim, on a gold ground; the Turks, however, have gilded over the angels, and turned the heads of the cherubim into stars. The gigantic texts from the Koran, on circular panels hung all over the mosque, destroy the scale of the building. Probably Sta. Sophia was much more effective when it was in the hands of the Orthodox Church, and its iconostasis had not been removed, for now the inside looks rather bare. The interior of St. Mark's, at Venice, is even more artistic and more gorgeous than Sta. Sophia. Owing to its nave being only about one-third of the width of Sta. Sophia, its comparative smallness excludes all idea of competition with Sta. Sophia, except in beauty and solemnity, nor is it so much oppressed with uniform lighting as Sta. Sophia, for there are dark recesses; nor with baldness, as besides the iconostasis, with its statues and columns, there is an isolated chapel and many altars, not to speak of the pulpit and ambo and the silver lamps. Like Sta. Sophia, it has been enriched with all the plunder of the East and West, from the columns of the Temple at Delphi to those of the Palace of Mausolus.

Nothing in the world that I have seen compares with the temples on the Acropolis of Athens for simplicity and perfection; the most recondite art has been used to make them seem artless, and to vary repeating members in that slight degree that, while seeming alike, they have those delicate differences that are seen in Nature's works, so that the eye never tires of looking at them, and is never satiated. As you gaze, there seems to come from them an emanation of sublimity, and though the whole looks absolutely free from mystery, you gaze till you find a deeper mystery about their superhuman perfection.

I go on with early Renaissance work because in it there was a similar ideal, though differently carried out. The Greeks sought ideal loveliness by perfect simplicity, the Italians by a delicately graduated ornateness that was the acme of perfection of its sort, and both were utterly opposed to the very genius of Gothic. Although the architecture of the Italian Renaissance was evolved from Roman work, its character was in many respects quite opposed to it. The Romans were masters of the civilised world, had an Imperial revenue, had a marked taste for massiveness and dignity, and were slaves to rule, having found it so useful in military affairs. The Italian Renaissance architects had, with few exceptions, been brought up as goldsmiths, in which delicacy was required, and before they became architects were painters or sculptors, and were, therefore, of refined taste. They had only the revenues of small trading communities to dispose of; but they were born artists: every fibre thrilled with emotion at all that was beautiful.

Renaissance work was, of course, wholly different from Greek; 1,800 years of change and of constructive progress must of necessity have altered the thoughts and conditions of men; but, besides this, there was the domination of a new religion and the interpolation of the wondrous era of Gothic, and these alone could not help modifying their thoughts as well as their methods. Still there is something of Greek sweetness in the work of Bramante and a few others of the Early Renaissance architects. The outside of Sta. Maria

delle Grazie at Milan (see lithograph), as seen from the east end, is one of the most beautiful Renaissance compositions I have seen. Certain pieces of the outside, and the interior of Sta. Maria del Miracoli at Venice, have almost the same merits. When I first saw the interior of Sta. Maria del Miracoli, in 1854, it was as lovely in colour as its carved marble was beautiful in form, and all the church trappings and banners were still there, as well as the later additions to the church; which, if not quite in accordance with the structure, added to its picturesqueness. I saw it long before it had been cleaned out, the additions and trappings removed, the marble scraped, and the ceiling repainted with the finest colours. It is difficult to make those who have been brought up in a Gothic school comprehend the feelings of the Classic student towards Gothic, more particularly when the works are small churches or secular buildings; the art has a sort of haphazard look, as if there had been no thought of its effect as a whole, and an absence of symmetry and of any feeling for propriety or beauty.

In the grander ecclesiastical Gothic buildings there is mostly uniformity on either side of the centre, and a good deal of the existing oddness is due to parts not being finished, or to their being completed at a later date.

On my return from Italy in 1855, Notre Dame at Paris was the only cathedral I saw in France that I looked at with pleasure, but as I grew older I saw that there was no common measure between the Classic and Renaissance ideals and the Gothic. The one asked for a clear and definite idea, carried out with coherence; for proportion, symmetry, and solemn dignity, like the calm flow of a strong, clear, and smooth river in the sunlight. The other appealed to wild emotions, to mystery, to the vague idea of infinity; it was like the storm-tossed ocean; while the artist was absolutely indifferent to congruity, to propriety, to anything but raising the highest emotions. These Western architects—for there was always some feeling for calmness and repose in the Italian Gothic architect, if we exclude those of Milan—remind one of a great musician playing before an immense audience, whom he wants to raise to ecstasy or drown in despair, and throws to the wind all the ordinary rules of music and composition, if he can only accomplish either or both of these two ends; it is almost like the comparison between Timotheus and Sta. Cecilia in "Alexander's Feast":

"He raised a mortal to the skies;
She drew an angel down."

I think, however, that if any architecture could draw angels down, it would be the Athenian, for it seems superhuman in its simplicity, calmness, and sublimity. Gothic is very human; it is full of aspirations, full of what might be called sudden impulses and whims, full of changes of purpose, full of bungles, full of weird and comic conceits, and almost as mysterious as life itself.

M. Jusserrand, in his "Literary Life of the English People," makes the following remarks on Gothic as compared with Classic architecture when speaking of Langland's poem of "Piers Plowman":—"No poem has been more really lived; it was for its author his refuge, his home, his true church; he always returned there to pray, to recount his troubles, and to live. Hence the strange incoherence, and, at the same time, a heap of unexpected information. The spirit that animated Langland is the spirit of the Middle Ages, powerful, disconnected, limitless. A Classic architect makes a plan, lays down beautiful arrangements, conceives a definite and complete work; the poet of the Middle Ages, if he makes a plan, does not follow it; he transforms it as he goes on; he adds a porch to his building, a wing, a chapel; a cathedral in the Middle Ages was never finished."

I give you this as the impression produced on an acute, intelligent, and charming writer who is not an architect. It is quite true that large abbey churches and cathedrals were rarely finished, or at any rate at one epoch; pestilence, famine, insurrection, and foreign wars took away the means of completion by causing want of men or want of money, and ambitious bishops or abbots were always seeking means of increasing the number of worshippers and pilgrims to their churches, whose offerings enabled them to beautify or add to the church; but I very much doubt if there was much more impromptu work about Gothic than Classic, for supporting complicated vaulting hardly admits of it, though it is quite possible the architects may have wanted to give to their buildings an unprepared air, and of course the aims of the Gothic and the Classic architect were absolutely different, but I

believe there is as little of the unpremeditated in architecture as there is in acting. In acting the whole effect is first thought out and studied, then rehearsed until the action becomes automatic. We can at once see what confusion there would be on the stage, if the action and movement of many actors were left to their impromptu solution.

Some historians merely tell us that they do not know what the philosophy of history means. Lord Bacon was not of that opinion, for he tells us that we study history to make us wise.

Machiavelli did not think so, or he would not have given us his philosophy of it. Guizot did not in that wonderful chapter in his history of the Civilisation of Europe, and if there be no philosophy in it, you may look on it as a bad novel, as a catalogue of crimes, or, as Byron said, "The Devil's Scriptures."

As yet there is scarcely an attempt at the philosophy of the visual fine arts, and, as far as I know, absolutely none of architecture, and it is mostly written of as you would about making a pudding. You want a good recipe for a good pudding. Yet I never look at any bit of architecture, modern or ancient, without what I call the philosophy of it engaging my attention. In looking at Attic and at Gothic architecture one is compelled to ask oneself what produced the extreme perfection of the one and the wondrous flight of the other. The knowledge and skill required to raise one of the great cathedrals, even if it appeared as little to the emotions as a modern iron bridge, are marvellous, and we know that in man's work no great emotion is ever evoked unless the soul of humanity is greatly stirred. In fact, mankind is but a poor collection of uninteresting atoms, when it is not swayed by some mighty impulse of faith, devotion, patriotism, or benevolence. We are surprised, in reading of the times of persecution and martyrdom, at the crowds that put themselves forward to incur both. The fact is that mankind soon get sick of life which is bounded by that simple formula, "to gormandise . . . to sleep and snore and rend apparel out;" the divine particle wants to assert its supremacy over that part that we have in common with the brutes.

The great personalities of the world have mostly been actuated by one of two motives, the hope of fame or of paradise, to enable them to undergo the requisite labour, and support the trials. Napoleon said his aim was fame, and one of the gravest charges Gregory Nazianzen brings against the Emperor Julian is this, that he defrauded those Christians of the certainty of paradise, who smashed the statues of the heathen deities; for instead of having them martyred by torture, he simply had them whipped, as Gregory says, not only by this malice preventing them getting a crown of glory, but also rendering them ridiculous.

We hear people talking of reviving Gothic. Industrious men who have the intelligence and capacity to learn what is to be learnt of it, would have the requisite knowledge and skill to reproduce an imitation of what the Gothic men did: but to reproduce the real Gothic that was produced in the thirteenth, fourteenth, and fifteenth centuries, you must not only have the same knowledge and the same skill, but the same surroundings, the same beliefs, the same desires, and the same enthusiasm, which is impossible. Consider the effect on man of one single circumstance that alone renders it impossible. Since the fifteenth century man has learnt that this world is not the centre of our universe, not even the centre of our system, but a mere speck among "yonder hundred million spheres." Modern Gothic is generally as much like the real thing as the Book of Mormon is like the Bible; but even supposing the forgery were so excellent that it would deceive an architect from the Elysian Fields, what then? You might compliment the modern architect on being an excellent and ingenious forger, but would his work give one scrap of our present knowledge, skill, taste, or aspirations, while if he builds a dead wall with holes in it he may show his own skill and taste, as well as the taste of a large proportion of the people.

M. Zola is one of the few great novelists who allows himself to notice that there is such an art as architecture in the world. In speaking of Ste. Eustache and the Central Market of Paris, he says: "This is a curious meeting . . . this end of a church framed in this avenue of cast-iron. . . . This will kill that; the iron will kill the stone; and the time is nigh. . . . Do you not see, there is there quite a manifesto; it is modern art, realism, naturalism, whatever you like to call it, that has grown big in the face of the ancient art. . . . This church is of bastard architecture, besides; the Middle Ages was dying there and there the Renaissance was lisping. . . . Have you

noticed what churches they build for us now? They are like anything you please, like libraries, like observatories, like pigeon-houses, like barracks; but certainly no one believes that the Almighty dwells within. The masons of the Almighty are dead, it would be wise to build these ugly carcasses of stone no more, when we have no one to lodge in them. . . . Since the beginning of the century one single original monument has been built, a monument which has been copied from nothing, which has sprung up naturally in the soil of the epoch; and that is the Central Market. . . . A swaggering work, and which is only a timid revelation of the twentieth century."

I will ask you a few questions. Is there any emotional subject now that would want a building to rival one of the great English or French cathedrals to express it? If so, would the nation subscribe the funds? Supposing you answer this in the affirmative, then I ask you, have you the skill to build it? And would the subject require you to raise towers and spires hundreds of feet high to properly express it, after you had lavished all your art on proportioning and enriching its exterior?

If no such ideal exists, and animates the people, how could you get Gothic again? An imitation Gothic building would resemble the real thing as much as the cast skin of a snake resembles the living creature! I am surprised, however, that nothing has been written to give us the least idea of the state of the people in those days. Long centuries of study, effort, trial, and failure, had produced the knowledge and skill in the architects necessary to erect such stupendous buildings. You may feel sure that the people had new aspirations of momentous import, and expected that these aspirations were on the point of realisation, to produce such astounding results.

I believe it was the overthrow of feudalism, and the evil power of the clergy, that was looming in the distance, as well as a prophetic vision of science and liberty, that so moved them. Depend on it, that the old proverb is true, that "Coming events cast their shadows before." Doubtless much more happiness was expected than has been realised. "Man never is, but always to be blest."

To find out the secret of how their emotional effects were obtained, we must adopt the same methods with the great Gothic cathedrals as we did with the Renaissance buildings and see what is due to proportion, what to shadow, what to sculpture, and what to fringes. There are three French cathedrals with the same motive, Notre Dame de Paris, Amiens, and Reims; each has three porches, a centre with a rose-window, towers on either side and a range of the effigies of kings. Notre Dame is the simplest and most masculine, and the architect has treated the arcade of kings better for sculpture as being nearer the eye, and as a composition uniquely; observe how perfectly the figures are framed for effect, and how the flat, cusped head of the arcade checks the eye from wandering, while the band of arcade and figures, binds the whole façade together; it was a stroke of genius. Looking critically at the front, the main story is too squat, and the open arcade above too high. Amiens has the best porches, their deep shadow is very striking when the sun is not on the face, though the fringe round the arches is trivial and spoils the solemn effect; the proportions of the front are not happy, and the whole is overdone with ornament that blurs the outline. Reims has the finest proportioned front; the arcade of kings is made important by putting the statues on pedestals; the canopies on the gable of the central porch looking like a flock of doves, is a quaint and rather a pretty conceit: on the other hand, the poking the rose window into a pointed arch is a bungle. Before you will get a building to vie with any of these, you must have a popular ideal to be embodied, passionately longed for, a style and a mastery of it, which I hope the profession is striving to get.

The proportions and the outlines of the Gothic cathedrals, not to speak of their vast size, greatly contribute to the impression they make on us, but just as the Athenian architects hid their art to charm a cultivated and fastidious people, so did the Gothic architects arrest the attention of uncultivated crowds by the means they employed. Screens, like lace, seemingly too slight to support themselves, and window traceries that accomplished everything that stone-work should not try to accomplish were sure to attract attention.

In the fronts of cathedrals there is an endless variation of plane, broken up by figures, niches and pinnacles; arches, too, were enriched with figures, twisted into every possible shape, and put in impossible places, such as

those canopied figures hanging down from the arches of doorways, apparently in defiance of the laws of gravity, while above and beyond the façades, towers, spires, pinnacles, and buttresses, are grouped. To find out what was essential to the main effect could only be ascertained by exhaustion. Most of you probably know how the method of fixing the impressions on daguerrotypes was found out. The chemists had tried everything their science suggested to fix these impressions without success. A silvered plate with its unfixed impression, was put away in a cupboard where glass-vessels and open chemicals were temporarily stored. After some time the plate was taken out for more experiments, and the picture was found to be fixed. Surmises were made as to what had fixed it, and experiments were tried on other plates, but without success; so fresh unfixed impressions were put in, and each article was taken out one by one, the last thing removed being a basin full of quicksilver, and it was then found that the impressions were fixed by mercurial vapour.

I have in a former course of lectures given some account of the various effects produced by the arrangement of the lines and by the light and shade at the Parthenon; it is of little use going over it again, as though the Parthenon is admirable for its purpose in such a climate as Greece, and the most sublime building in the world in Greek atmosphere and sunshine, it is of little use to us in our climate, as well as being absolutely ineffective in our atmosphere for more than half the year; I may add that the long straight-topped façade of Lincoln forms much the same contrast with the towers, as the steps do with the Doric columns of a Greek temple, only in the former the parts contrasted are colossal.

The apse of Bramante's Sta. Maria delle Grazie at Milan is one of the most perfect examples of charming effect that is to be found in Italy. Very little would be lost in its general effect if the greater part of the subsidiary forms and enrichments were left out, for the main effects are due to the happy proportions of the horizontal divisions, and to the composition of shapes due to the plan; that is to the polygonal arcade over the dome, to the contrast between the square parts and the round apses, and to the shadows cast by the overhanging roofs: though something no doubt depends on the circular panels in the surbase, the round shields in the first floor stylobate, and the round windows above, which so admirably contrast with the vertical and horizontal lines, and give the necessary suavity to the whole composition. With the exception of the arcade of the crowning polygon, there is very little shade from openings, most of the windows being small circular ones, and glazed near the outer surface. I think there are only two rectangular window openings in the apses above the surbase, and one above, which show in the same view; but, although the composition is both elegant and lovely, it hardly impressed me with the solemnity proper for a large church; it looks more like a palace, where all the arts of war and peace were being studied, and the amenities of high life being practised. It might have been the palace where the attainments proper to a courtier were being descanted on by Count Baldassare Castiglione. The inside is from the hands of some bungler.

There is a most beautiful composition on the moat at Nuremberg; it is merely a sort of open loggia, seemingly used as a tannery, on the top of a house; the simple but delicate shapes, with a due proportion of light, shade, and shadow, make it one of the few things that any first-rate architect might be proud to have done. Bramante's façade of the Sta. Maria del Popolo at Rome is also very sweet, very simple, and very effective; it owes some of its charm to the graceful lines that cut off the segmental pediment to admit the central feature.

Among the buildings whose admirable effect depends on the contrast of shapes, and on shade and shadow, is the Fountain of Ismael Pasha at Cairo. The lower part is semicircular on plan, and is built of stone, with large segmental-headed windows filled with bronze open gratings of quatrefoil pattern, with what I took to be a wooden polygonal building on the first floor. It was, when I saw it, in a very dilapidated condition; the widely-projecting roofs, with double rows of pierced eaves-boards, cast deep shadows, with fringed edges, and there was a great contrast between the simplicity of the massive stonework of the ground story, and the slightness and great variety of the smaller forms and openings above, but it could only be effective in a sunny climate. We must never forget that for about three-quarters of the year we have, for the most

part, a dreary, sunless, misty climate, and must try and make our buildings effective in that climate; while in our manufacturing towns we have dust, soot, and a corroding atmosphere, so that all fine work is soon filled up with dust and soot, and plain surfaces are eaten into. In London, almost the whole merit of Corinthian capitals is lost, for whiteness here in London means bad stone that rapidly decays.

We must content ourselves with the reflection that the climate produces a vigorous race, who have managed to live and thrive in every climate in the world; besides, it is the difficulty of succeeding that stimulates effort, gives pliability to the mind, and will also help to give a national character to our architecture, just as an able planner shows his skill with a very irregular piece of ground.

George Mason had been studying sunlight in Italy for fourteen years, and when he settled again in his native county, North Staffordshire, he was in despair, as the sun rarely shines there; but when the President pointed out to him that there were beautiful episodes to be painted in that grey atmosphere and weird scenery, he took heart, and painted the most poetic subjects that England possesses. Our Gothic architects did not sit down and weep, and say architecture was impossible because they had not the sunshine of Asia Minor, Syria, the Hauran, or Cairo, but did what the Greeks did—they tried to make mouldings and forms that would tell in their own climate; they had not the taste and refinement of the Greeks, but they made their mouldings tell. If they wanted a streak of light on a cylindrical surface, they put a fillet or a nose on it, and they made the outlines of mouldings tell by undercutting. It may be urged that we should use Gothic, but that does not represent our knowledge, skill, or taste. The Romans were appalled by Pyrrhus' elephants, could not resist them, and were trampled down by them in the first battle; but they did not give it up as hopeless; they said, cannot we frighten these great beasts and make them trample down their own people, and tried the fire-balls that succeeded.

I only recollect one building in London that gains by the dreary climate and the soot—Newgate. When we see that roughened, black, massive corner in Newgate-street, we always think of Dante's lines, "All hope abandon ye who enter here."

The streets of London call loudly for some brightness and colour—we even hail with delight the blue and white tiles of the oleo-margarine shop.

Directly you go out of genuine architecture—Greek, Byzantine, Gothic, or Saracenic—you have this ugly fact before you, that the beauties are obtained by the skilful and artistic handling of what in itself is a pretence, for, as a rule, Renaissance buildings pretend to be open colonnades walled up.

Cornices are, in my opinion, not only reasonable, but proper for every building that has dripping eaves, for they take the rain-water outside the walls, so that overflows do not damage the building, and strings are reasonable things as ornamental coverings of the external sets-off of walls; but engaged columns or pilasters are nothing but the pretence of posts or pillars carrying a bressummer, walled between. If we can shut our eyes to this ridiculous pretence which has done so much to prevent any rational development of architecture, we must admit that the application of all the most brilliant architectural talent of Europe to this form has nearly brought it to decorative perfection. I think few persons of taste will deny that there is an excellence of proportion, a beauty of execution, a certain stateliness, and a style, about the best examples, that surpass anything since the palmy days of Greece. Take the Town Hall of Brescia, for example (see lithograph), said to have been built in 1508 by Formentone; suppose that a building were required to produce a definite idea of stately magnificence, could any building convey it better? The building is of large dimensions, two stories high, the top piece above the crowning balustrade being comparatively modern; the ground floor has but three arches; in the spandrels are hemispherical recesses containing busts, life-size at least; in the middle of each pier is an attached Corinthian column, round which the entablature breaks, and at each end is an additional pilaster to take the balustrade, that leaves a walk between it and the walls of the first floor. The frieze of the ground floor is ornamented with lions' and men's heads. The first floor has three immense windows, whose dressings are Corinthian pilasters with an entablature. The friezes of these are carved

with foliage and figures in high relief, and they are capped by a modillion cornice; four pilasters, with carved shafts, form panels for the windows, and between each window and the pilaster is a large boss about the middle of the story. The whole is crowned with an entablature about one-seventh of the whole height of the building; this has a richly-carved frieze in high relief; above is a gigantic balustrade with four figures standing in front of it, which we think can hardly have belonged to the first design, and on the balustrade are four larger figures, and there are obelisks at each end. The height of the building is about five-sixths of its width on the ground floor.

No architect with any feeling for stately proportion has seen this for the first time, without thinking it is one of the finest halls he ever saw. The effect is produced by a mixture of sculpture and architecture, but, architecturally speaking, the sculpture is merely a method of accentuating the upper pilasters and the friezes, and giving variety to the sky-line. The regular repetition of the lions' heads on the lower frieze give scale to the building, and as a feature could not be left out, nor could the hemispherical hollows in the spandrels, for these repeat the deep shadow of the lower arcade. I do not know if the palace has been measured, but if it has been, a most valuable lesson might be learnt by drawing out the front, without the sculpture, by substituting plainer orders, or leaving them out, to see what is absolutely necessary to obtain an equally impressive effect. It is only when this has been done that you could see what is due to the proportions, including the projections, and what to the sculpture. It is only by such means that a student can get the requisite knowledge, for executing a building to rival it in effect.

For mere beauty of line and composition few things are equal to the front of Bramante's Cancellaria, but being of such great length its parts are hardly bold enough in projection to make it effective.

For grandeur and calm dignity, there is perhaps nothing superior to the Farnese Palace, in spite of its improprieties, its inconsistencies, and, to say the least, the commonplaceness of its ratio of height to length. It has the merit of not being disguised by attached columns or pilasters, and has the advantage of great size, an advantage that should never be overlooked; and though San Gallo (Antonio Piccone), Michelangelo, and Vignola are said to have had a hand in it, they have managed to keep the appearance of size, and each of them has understood the value of monotony and repetition in producing an effect of grandeur. It is dull, I might say excruciatingly dull, but I fear that that is the price one has to pay for grandeur. For such a building, whose propriety and convenience have obviously been sacrificed to external effects, the angle-windows are too near the corners. I think the first-floor windows would have been better had the pediments been alike, and the Venetian window in the middle is only saved from being a gross bungle by the three grand shields over it. The rusticated cart entrance is out of keeping with the rest, but in my eyes the greatest fault is the great height between the tops of the upper windows and the top of the cornice—it suggests garret windows behind; for enormous vaults can hardly have been needed for the retainers' bed-rooms.

There is stateliness and dignity in the Vendramini Palace, and inventiveness and art in the Spinelli and the Manzoni Palaces, but there is too great a want of repose in both the latter for great stateliness or dignity. The Hall of the Confraternity of St. Mark (La Scuola di San Marco) is one of the most fascinatingly beautiful buildings in Italy, and what may be called its porch is the perfection of adorned beauty, but its perspective architectural panels are, I think, a mistake. Still we should never forget that "a thing of beauty is a joy for ever."

THE ARCHITECTURAL ASSOCIATION: LONDON BRIDGES, ARCHITECTURALLY CONSIDERED.

THE ordinary meeting of the Architectural Association was held on the 15th inst. in the Meeting-room of the Royal Institute of British Architects, 9, Conduit-street, Mr. E. W. Mountford (President) in the chair.

Mr. B. F. Fletcher (junior hon. sec.) proposed a vote of thanks to Sir A. Blomfield for allowing the members to go over the new Church House at Westminster, and for the remarks thereon supplied by him. This was unanimously agreed to.

Mr. H. H. Statham then read the following paper on "The Bridges of London," which was illustrated by lantern pictures:—

In taking for my title "The Bridges of London, Architecturally Considered," I am aware that in the two last words I may seem to be begging a rather large question, in assuming that there is an architectural quality in a bridge which can be considered apart from its utilitarian side. Some of us probably think, and I should be inclined to agree with them, that it is a great pity the professions of engineer and architect were ever separated at all; that every architect should be an engineer and every engineer an architect; and that the result of the separation has been that we have one set of men who devote themselves entirely to constructional problems, and ignore—are almost trained to ignore—the artistic and expressive aspect of construction, and another set who devote themselves mainly to the artistic side of construction, and sometimes know much less of its scientific side than they ought to know.

In regard to bridge building, however, there is a rather distinct line of demarcation in the work, and that is the line of the water-level. It must not be forgotten, in considering the subject, that in building a bridge over water of any depth, and more especially water which is actuated either by strong currents or strong tides, the most difficult, and in a sense the most important part of the whole work, is that which is under water; and it is impossible that this could be successfully dealt with by any one who has not had special experience and special training in that kind of constructive problem. When we come above the water-line the problem becomes one of ordinary construction, which is, or ought to be, as much within the province of the architect as the engineer, unless in such exceptional cases as that of the great lifting leaves at the Tower Bridge, which again form an exceptional problem demanding a kind of mechanical knowledge which is not properly within the domain of the architect. We, as architects, may therefore rightly leave to the engineer the problem of bridge foundations under water, admitting our inability to deal with it adequately; we only claim to have something to say in the matter when the work gets above water. And this, not only because the constructional work there is not (or, shall we more prudently say? ought not to be) beyond our capacity to deal with, but because the question of the design and expressive treatment of the superstructure, which comes into our special province, is of far more importance than it has been generally allowed to be. The fact is, there is hardly any kind of structure which may have greater influence, for good or bad, on the architectural effect of a city, than its bridges, in those cases where a large river flows through it. The bridges in such a case are among the most prominent objects in making or marring the general effect and impression of the place. They are seen both from the banks and from the river, they are seen on both sides (unlike many town structures), they are seen from above and from below, from close at hand or from a distance. In the most crowded city there is a clear vista along the river, and its banks. You see the bridges in succession, a perspective of beauty or a perspective of ugliness. And what class of structure can be more capable of beauty than a bridge? Its series of arches contrasting with the long lines of its cornice, and balustrade, and with the masses of the piers; the cut-water bases of the piers, which every bridge built in running water must have, and which give such a special character of the picturesque founded on the practical; and above all its situation above the surface of water, with all its magical effect of movement, of glittering lights (even Thames water looks beautiful in the sunlight), or of calm reflections; can there be any greater possibility for the production of architectural charm than in such an erection in such a situation? The very simplest stone arched bridge is an object of beauty, if you trust only to its natural disposition of lines and masses, and it takes a good deal of bad detail to thoroughly spoil it, unless the detail is very large and prominent indeed. Unhappily there seems to be now an increasing desire to build what are called "handsome" bridges, in which there is a great deal of detail, often very large, and generally very bad; and I hope to show that some of the older bridges of London, now removed, which were much simpler in design than their successors, were also far superior in architectural quality.

Let us first, however, briefly consider the architectural treatment of bridges in a more general sense. In regard to architectural expression there are four principal points to be considered: (1) The shape and proportion of the arches; (2) the treatment of the soffit of the arch; (3) the treatment and design of the piers;

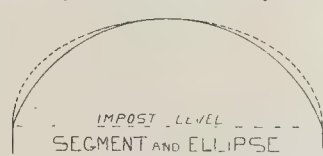
and (4) that of the finish of the bridge along the top, i.e., the cornice (if any) and the balustrade, or fence-wall. This latter is entirely independent of the construction of the bridge, but its design may have an important effect on the general appearance of the structure.

For anything worth calling a monumental bridge, in an architectural sense, there is but one material, stone, which can be regarded with entire satisfaction from our point of view. There are cases, chiefly those of railway bridges, in which stone cannot be used, at all events for the portions between the piers; we shall have to touch on that point presently; but for ordinary traffic there is hardly any case, except that of a draw-bridge, in which stone arches cannot be used as well and as satisfactorily as iron cantilevers or girders, as some of the existing examples among London bridges completely prove, and with infinitely better effect. As soon as you introduce iron, however well designed, and however massive your stone piers may be, you at once destroy the monumental effect of the structure as well as its unity of expression; you force into architectural union two materials which are radically distinct in character and in properties; you introduce an element of decay, for however long iron may last, the most enthusiastic believers in that material can hardly pretend to believe that it will last as long as a built structure of granite, or even of a good building-stone; still worse, you introduce, as a necessity, the element of paint, a disagreeable artificially-made surface, which can never harmonise with nature as pure stone-work will. For the finest effect attainable from a bridge it must be entirely of stone, balustrade and all; even an "ornamental" iron balustrade interferes with and spoils the breadth and unity of the composition.

The number and relative proportion of the arches is a matter which is to some extent governed by practical considerations. Almost invariably it will be found that the older bridges have a larger number of arches, of smaller span, than the modern ones; in all the cases of London bridges which have been rebuilt, with the single exception of the Hammersmith Suspension, the modern ones have fewer and larger openings than those which they replace. This is in the main for the purely utilitarian reason, in the case of a river crowded with traffic, of offering the least possible obstruction to the water-way; with the additional economical reason, when bridge piers are now, that the cost is to a great extent proportionate to the number of foundations to be provided. In all probability the older bridges would for this reason have been built with fewer arches, even when the question of waterway was not so important, but for the fact that the older builders were not bold enough to venture on arching over a very large space. Nevertheless, it can hardly be questioned that the older type of stone bridge, with numerous and comparatively narrow arches, was in general a more picturesque object than the modern bridge with its wide spans and comparatively flat curves. Landscape painters who introduce a bridge as an incident in the scene will be found, I think, always to prefer a bridge of many arches to one of the modern type. But in the case of a river running through or past a great city, and which forms the water highway for its traffic, the reduction in the number of piers becomes a continually increasing necessity, which in the case of our last new bridge, placed at the point where the river traffic is thickest, has resulted in the employment of an entirely new mechanical arrangement for avoiding interference with the passage of shipping. Wherever water traffic has increased, however, there is always this continual fight going on between the architectural claims of the bridge and the practical claims of the water traffic. Some of the Thames bridges above the London district, such as Wallingford, Sonning, and Chertsey, are very picturesque, and Kew is as charming a specimen of bridge architecture as could be seen; and as far as the two former are concerned there seems no reason why they should not remain as they are, since the traffic is not extensive except in the way of pleasure rowing-boats. But Chertsey Bridge, where there is more going on, and where the arches are unusually narrow, has been found to be a practical inconvenience, and being, as American visitors say of our cathedrals, "somewhat out of repair," it will probably be removed before long, and will, undoubtedly, be replaced by one with wider spans—let us hope not an iron one. Kew I call a beautiful bridge, of finer design and much better built than Chertsey, and with fairly wide arches, and if it were an upper Thames bridge it might

be adequate to its position for a long time to come. But it crosses the tidal portion of the river, where at spring tides the rush of water is tremendous, and it is at such times both an obstruction to the flow of water and a danger to the navigation: in the side arches the water during a strong tide is so thrilled that the surface is forced up into a convex curve between the piers, and I have heard of cases of rowing-boats having to give up the attempt to pull through the arch against the tide. For these reasons we may probably consider that Kew Bridge is doomed before long, and it is to be feared that there is little probability of its being replaced by any structure at all equal to it in architectural effect. But the very fact of this necessity for the removal of some of our most picturesque existing bridges is an additional reason for calling attention to the subject of the architectural aspect of bridges, in the hope that we may persuade those who are concerned in rebuilding them to give some consideration to their architectural as well as their engineering treatment.

The form of arch to be adopted must be to some extent ruled by the proportionate width of opening in regard to the height of the roadway above the water-line. In the old-fashioned bridges, with narrow openings, the semicircular or the pointed arch could be used, and there was little to choose between them except as a matter of consistency of style. Medieval bridge-builders, however, were rather given to use a segmental pointed arch, with heavy longitudinal ribs or groins abutting against the piers, as in old London Bridge, and in the interesting old bridge at Huntingdon, still remaining; but though this has a fine, solid, and picturesque effect, it is bad practically, as it lowers the headway unnecessarily near the piers. For rather wider proportioned spans the Tudor four-centred arch would be a serviceable form, if a pointed arch were desired as a matter of style, as it gives a flatter proportion, while at the same time rising quickly from the pier. When, however, we come to spans of 120 to 150 ft., as in Waterloo and London Bridges, none of these forms are applicable, and we have only the choice between an ellipse or a segment of a large circle, of which the first is illustrated in London Bridge, the second in Waterloo and new Putney Bridge. Of the two, I think, on the whole, the ellipse is preferable. It is a complete curve instead of an incomplete one; it rises tangentially from the vertical face of the pier, which is more pleasing to the eye than the abrupt angle made by the segmental arch; and where the springing is not much above the water-line, it has a practical advantage in giving more vertical space near the piers. For an arch of the same width and height, it, of course, means a rather flatter curve in the upper portion of the arch than would result from the use of the segmental arch, but the practical difference in this respect is not



after all very great. The segmental arch is no doubt simpler to construct, and where a pretty good height can be obtained in proportion to the width, as in Waterloo Bridge (which is 37 ft. rise to 120 ft. span), there is something grand in the simple sweep of the segmental arch; but where the proportionate rise is less, as in Putney Bridge (which is 144 ft. span to 18 ft. 6 in. rise), the arches have an appearance of being jammed between the piers instead of "springing" from them, which is not agreeable to the eye.

The question of symmetrical spacing of the arches is one which has been often debated. Where there are any peculiar circumstances which afford a suggestion for a different treatment of different sections of a bridge, I think these should be taken into account and frankly expressed in the design. There is an interesting example of this in the old stone bridge over the Dee at Chester, where the river is broken by shallows or rocks into several channels, and the bridge arches have been built of varying widths, just as the foundations of the piers could most economically be made; the effect is picturesque and characteristic. This is an exceptional case, however, and there can I think be no sort of excuse for irregular spacing of the arches of a bridge unless there is this kind of obvious reason for it in the nature of the site. But take

the case, which may not infrequently happen, of a bridge over a river of which one side of the visible water area is shallow and unfit for navigation, and the navigation is necessarily confined to the deeper half of the stream; there would then be a legitimate leading to a picturesque treatment, building the bridge in a succession of narrow arches over the shallow portion (where the foundations of the piers would, if the ground were good, be a comparatively easy matter), and throwing one or two wide arches over the navigable portion. Thus there would be a highly picturesque effect of contrast produced, which would actually be a visible index to or proclamation of the physical conditions of the waterway. There are portions of the Thames where this reasoning in bridge-building would fully apply; but not within the London district. There we have no excuse, as far as the waterway is concerned, to depart from symmetry in design; and to my mind bridges which form portions of the architectural scenery of a great city should be treated symmetrically, when there is not any obvious practical reason to the contrary. But there is still the question whether we should preserve the same span in all the arches, or treat them with a symmetrical variation. Of our three finest bridges—London, Waterloo, and Putney—the first and last are designed on the principle of keeping the central arch widest and diminishing the others in an equal ratio each way. In London Bridge the centre arch is 152.6 ft. span; the two next 140 ft.; the end arches 130 ft. In Putney Bridge the centre span is 144 ft.; the two adjacent arches 129 ft., and the two end arches 112 ft. Waterloo Bridge, on the contrary, marches straight across the river with its regular stride of 120 ft. to an arch. Which method should be employed depends partly on whether you are anxious to keep your bridge roadway perfectly level from end to end, in which case, of course, the unvaried width of arch renders it easier to do this; but in every other respect the merit seems entirely on the side of the symmetrical variation principle, with the widest arch in the centre. A slight rise towards the centre of a bridge does not seriously inconvenience the roadway traffic—indeed there is a story of a country carrier who, on first crossing a modern-built bridge with a level roadway, grumbled that "he did not call that a bridge, for you could not tell when you came on it and when you were off it"; the slight curve of the balustrade and cornice line is more pleasing from a distance than a rigidly straight line; the variation in width of arch gives an increased interest to the design without destroying bi-lateral symmetry; while the greater width of the central arch is an actual convenience to the water-way traffic, especially on a river where a great deal of the barge traffic depends mainly on the tide for locomotion, and naturally keeps in the centre of the river where the tide runs strongest. The wide central arch is in fact only carrying out permanently and architecturally what had before been done temporarily, for the first step towards rendering some of the old London bridges more suitable for the increased water-way traffic consisted in knocking one or two piers out of the middle and making a wider arch there. That was done both with old London Bridge and old Putney Bridge, long before they were finally removed.

But the design of Waterloo Bridge suggests another point. I said just now that there was nothing in the condition of the waterway of the Thames at London to justify or suggest an unsymmetrical treatment of the bridges. But there is something to suggest this in the levels of its banks. The main line of traffic with which Waterloo Bridge is connected at its north end is at a much higher level than that at its south end. Perhaps few of those who, after alighting at Waterloo Station, are dragged by a straining cab-horse up the gradient leading to Waterloo Bridge, realise that this up-hill tug is all in order that Waterloo Bridge might realise its uncompromising severity of design by being carried at a uniform level right across the river, from the high bank to the low one. In the case of London Bridge there is the same kind of discrepancy between the design of the bridge and the bank levels, but to a less degree, as the ground on the north side falls rather towards the bridge, and the difficulty has been partially evaded on the south side by "fudging" to some extent the lines both of the parapet and the roadway, so that about 3 ft. of the necessary fall is obtained on the bridge itself, without the effect on the symmetrical character of the design being very noticeable unless looked for. Attention was drawn to this point in an interesting paper on the bridges of London, considered mainly from an engineering point of view, read

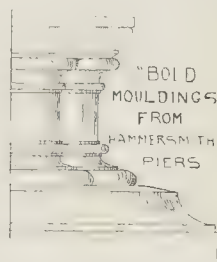
four-and-twenty years ago before the Institute of Architects by an engineer, Mr. Henry Carr. Speaking with special reference to Waterloo Bridge, he propounded the question whether the right treatment would not have been to have kept the highest point of the bridge as near as possible to its north end, and built it in a descending gradient from that point, to meet as far as was possible the lower road levels on the south side. There would then have been a long and easy gradient, partly on the bridge, instead of the present short and steep one up to the bridge level. Mr. Carr admitted, however, that "he would have been a very bold man who had ventured to adopt such a course;" and I think we must all agree that the majestic character of Waterloo Bridge would have been much impaired thereby. Still it is a question whether the architectural dignity of the bridge should or should not have been impaired for that practical consideration; a question which might perhaps enter into our discussion to-night.

In regard to the second point, the treatment of the soffit of the arch, this will depend somewhat on the general style of the design. In those bridges which are what is generally called "Classic" in architectural character, it seems almost a matter of course that the arch should be built with a plain flat soffit; and as there is no constructional advantage in doing otherwise, there is perhaps nothing to be said against this treatment when it is in harmony with the rest of the design. Certainly nothing in the way of ornament should be introduced on the underside of the arch, which is the constructive portion of the bridge, and should have an appearance of rock-like strength and stability. But if a bridge be designed with any of that more stern and sinewy character which we associate with Gothic work, the method frequently employed, as already observed, in Medieval bridges, of building the arch in parallel groins with a recessed surface between them, certainly gives additional force to the design, and may even be a saving in material, though such saving would no doubt be counterbalanced by the increased superficies of work on the groin ribs. This effect of parallel groins on the soffit has actually been adopted in some of the modern bridges with iron arches, the arches or cantilevers forming visible ribs, in a manner which is perfectly logical as an expression of the construction.

The pier of the bridge has been the great *crux*, in the architectural sense, of bridge-designers, and it is where the modern bridge-builder most frequently fails, owing mainly to a departure from simplicity, a desire to do something clever and "handsome." As before observed, a bridge must have a cut-water on the lower portion of its piers in the direction opposed to the current; and in many old and simply-designed country bridges, the whole pier towards the current was built out at an angle, ending in a sharp point, and either carried up in this form to the parapet, forming a triangular "refuge," or stopped below the parapet by set-offs, and becoming a triangular buttress. The down-stream side of the pier would be left flat. We must all have noticed such bridges in stone-building districts, and observed their picturesque effect. There are instances to be found, I think, among old bridges, and certainly among modern ones, where bridges in a running stream have been built with a cut-water both up and down stream—for symmetry, I suppose. It is better, no doubt, that the water should have a curve to run round on uniting on the down-stream side of the pier, or it may wear away the angles, but it is quite sufficient for this purpose to make a semi-circular finish to the plan of the pier on the down-stream side; there should be nothing like a cut-water, which should be confined to the up-stream side, otherwise you lose a natural source of character in the design. In the larger bridges which are erected over large rivers and in connexion with large cities, the cut-water form is now seldom or never carried higher than is necessary to clear the highest water-level of flood or tide; to do more would be a serious waste of material in a bridge on a large scale. There is, however, a general sense that it is in the fitness of things that the pier should be emphasised by carrying its face beyond the face of the arch, both to divide the arcade in an architectural sense, and to give both the appearance and the reality of greater weight and mass to the pier. How is this emphasis to be expressed architecturally? In the Pont Neuf at Paris (a small bridge compared with our London ones) the treatment is very simple and very effective; the cut-water form is carried up to a considerable height, and a semicircular balcony is corbelled out from it. The semicircle is a better form for an alcove or refuge than the triangular space which would be given by the shape of the pier itself; and

the whole arrangement is both picturesque and practical; but it would not apply to bridges of such large scale as ours. There we have to leave the greater part of the cut-water as a bare shelf, bevelled or curved to allow any water that may get on it to run off; only the portion close up to the pier is generally treated as a square plinth to receive whatever kind of projection of the pier we may put on it. Now constructively this projection of the pier is, if anything, a buttress, for any constructive function that it can have is to increase the lateral stability of the pier; and it might quite suitably be treated as a buttress, and sloped off to the main plane of the bridge. Most of our large modern bridges being, however, on Classic lines, the buttress would seem to be out of keeping as a matter of style; and in that case the simplest and most effective treatment is just to project the whole mass of the pier outward as a square projection, carrying the cornice round it. This is the way it is treated in London Bridge and Putney Bridge, and in some of the best of the larger up-river bridges—Kingston, for instance. But with too many of our modern bridge-builders there seems, unfortunately, to be a rooted idea that this projection of the pier is a place designed by Providence for the display of the columnar orders in some form or another. A couple of flat pilasters on the projection might give it a certain architectural grace without robbing the structure of its solidity, though certainly detracting from the appearance of power; but to put detached or semi-detached columns in place of the projection of solid masonry is to deprive the pier of the effect of mass, and to place a feature intended to support vertical weight in a position in which what you really want is lateral strength. And when, as we shall see in some instances, even the advantage of the graceful proportion and effect of the Classic column is abandoned, and short thick stumps are introduced, the result becomes palpably absurd as well as ugly.

The cornice of the bridge, if it is a bridge of Classic type, should range with the level of the roadway, representing the crown of the solid construction, so that the parapet can be designed equally for inside and outside appearance. The cornice should be of bold and simple character, as befits a grand engineering construction on a great scale; but, on the other hand, we must guard against the mistake, so often made



in engineering works, of seeking for "boldness" by means of mouldings of enormous size. The result of that is merely to make the work look coarse and to reduce its apparent scale. Engineers may no doubt shelter themselves behind the example of Michelangelo, who did the same at St. Peter's; but that was one of Michelangelo's mistakes. In regard to the parapet, I think a bridge should always have a pierced parapet of some kind; a solid parapet gives it a heavy appearance, a pierced parapet offers a pleasing contrast with the heavy masses of masonry of the constructional portion, and the same time marks the fact that it is an addition and not an essential portion of the construction. But the more simple the design of the pierced portion the better; an exceedingly ornate parapet design is out of place and seems to force itself on the attention too much, besides detracting from the breadth and solidity of effect proper to a bridge. Unless a bridge has something decidedly Gothic in its general design there is really nothing better for the position than a simple repeating baluster of the Italian type. The lamp standards should be placed over the piers, not in the centre of the arches. They are so in all the older bridges as far as I have observed; it seems to have become a modern practice to place them over the centre of the arch; a mistake both architecturally and practically. On the pier they assist in emphasising its vertical line, and seem in their proper place architecturally, and while the position makes no difference to the traffic on the bridge, it is certainly better for those in boats passing under the bridge to have a cross light from both sides of the arch than a single one over their heads.

It may be a question whether the spandrels of the arches should be regarded as a field for the introduction of ornament. I can only say for my own part that I can hardly imagine any kind of design for a monumental stone bridge which would not be spoiled and weakened in effect by cutting up the spandrel with ornament. In the case of bridges with iron cantilevers the space between the upper and lower member no doubt seems a suitable one for an ornamental filling, though the efforts that have been made in this direction have not so far conduced to the happiness of the spectators. Where there is a sufficient mass and projection in the piers it may be suitable enough to place a niche and a statue, provided that you are going to afford sculpture of the highest class and of a grand type of design.

Having gone so far into the abstract, let us now turn to the concrete part of our subject, the London bridges. The London jurisdiction over the bridges extends from Hammersmith Bridge to the Tower Bridge; those from Hammersmith to Waterloo being under the County Council, while Blackfriars, Southwark, London, and Tower Bridges are under the Corporation of London. The various railway bridges have I presume to be passed by the authority under which they are built, but the companies' engineers are responsible for their design.

We may look first at a few of the up-river bridges, as I have photographs of them here; they are pleasanter objects than some of the lower ones. Wallingford is a pretty specimen of the old-fashioned country bridge with narrow arches. I do not know its date. Kingston Bridge, built by Lasside in 1825, is very modern in style by comparison, and may be called a fine and stately work of its class. The arches are elliptical, the centre one being 60 ft. span. It will be observed that the surface moulding which terminates the cut-water does not, as in most of our recent bridges, form or coincide with the springing of the arch, but is independent of it; a treatment which gives less unity of effect. I should have liked the pier better without the panel in it; and the thrusting forward of the balustrade on the cornice, over the pier, to get a deeper recess, has certainly not a good effect; but in the main this is a very pleasing and dignified bridge. Richmond Bridge, built in 1780 from the designs of James Payne, is a work of somewhat the same type but with segmental arches, and with a greater unity of design about it, and in spite of the Classic character of its detail there is a lingering of Gothic sentiment about it which is interesting. The same may be said of Kew Bridge, built two or three years later by the same architect (civil engineering was hardly a distinct profession then), in which it will be seen that the square projections marking the piers are actually treated at the foot in a kind of buttress set-off form, widening them out to give greater stability where they are exposed to the force of the tide. The gradients of this bridge are rather steep practically, to modern notions, but this rise and fall of its lines forms a great part of its beauty, and it may be said to be a bridge in which in point of good taste there is absolutely nothing to find fault with.

Alas! what a sad fall it is when we come down to Hammersmith, and get the first start into the official domain of London. Let us look first at the old Hammersmith Suspension Bridge, designed by W. Tierney Clark, in 1824. This had the defect, in common with the Tower Bridge, that the real suspending point of the chains was hidden behind a veil of masonry; but apart from that, though it is not a remarkable design, it is, at least, an inoffensive one; there is nothing about it that can be said to be in bad taste. But look at the thing that has taken its place! An iron construction simulating stone, except that the proportions of the towers are far too slender for stone; painted stone-colour to aid the illusion (?), stuck over with enormous crests and spikes, the towers "decorated" with cast-iron realistic flowers in panels, the land attachments for the chains masked by enormous scrolls and gigantic cabbages, acanthus leaves in cast-iron, the whole lump being 16 ft. in length, and the most horrible piece of coarse detail that it would be possible to set eyes on. A late French novelist, Guy de Maupassant, laid it down as a maxim, "Whenever you see an engineer, shoot him," and though, as a general rule of conduct, this may seem harsh and rather one-sided, it is impossible not to recall it when one looks at the new Hammersmith Bridge.

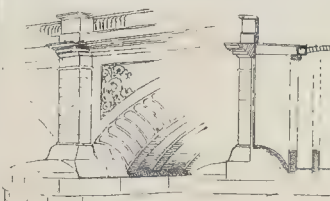
Happily our next step down the river brings us to better things. Putney is blessed both in the memory of its old bridge and in the presence of its new one. Old Putney Bridge, built in 1729 by Thomas Phillips, the "King's Carpenter," was the first bridge near London after London Bridge, and was, as you all know, one of the picturesque timber erections which were not uncommon at the time. Before looking at it, we may glance at a smaller bridge of the same kind, the original Ebury Bridge, known also as "Jenny Whim's bridge," as it led to the "Jenny Whim" tea-house. The latter, Mr. Wheatley tells us, was not removed till 1865; the bridge, in what is now the heart of Piccadilly, was probably standing within the memory of people still living. Of Old Putney Bridge I can show you what is probably the last sketch of it ever made, which I made from a boat moored by a long line to one of the piles, getting a view which could not be had from the banks. The old bridge was a great nuisance to the water traffic in latter days, and was getting very shaky, but it was one of those picturesque things that one is sorry to lose; it had served its purpose well in its time, and considering how strong the tide runs there, and that at spring high-water the river is 30 ft. deep over a considerable portion of its width, it is highly creditable to Thomas Phillips that his pile stood as long as they did. The new bridge, built a little way above the old one, is a noble and solid erection of granite, treated in the simplest manner, and is on the whole the most satisfactory bridge we can show next to London Bridge; for though of course not so grand as Waterloo, there are faults in the latter which there are not in this. The arches were built on curved box girders as centreings, and it is curious that at least two architects mistook the centreings for the bridge, one of whom wished me to publish an indignant letter of remonstrance against this Vandalism of an iron bridge at Putney. It is noticeable that both this and Hammersmith Bridge are credited to Sir Joseph Bazalgette, but surely it is impossible that they could both be the outcome of the same mind!

The railway bridge just below, with its straight girders carried on black cylinders, recalls us to the point touched on just now, as to the special conditions of railway bridges. "A bridge for ordinary traffic has to provide for a load which may move in almost any direction, and may be all over the roadway. A railway bridge provides for a very heavy moving load, which is always in one fixed plane parallel to the length of the bridge. It requires a very rigid road, and the problem admits of carrying the strain to isolated supports at fixed points. Hence the predilection of railway engineers for the straight girder and the iron column. The railway bridge at Grosvenor-road, by which the trains out of Victoria cross the river, is one of those on what are called arched girders, though, in fact, the curved member ought rather to be regarded as the compression member of a kind of double cantilever; it certainly does not act as an arch in the same sense as a built arch. The Grosvenor Bridge, which has massive stone piers, very suitably treated, as skewbacks for the girders, is, *quid* railway-bridge, a very passable-looking structure; but every one who has sat in a train giving up tickets at Grosvenor-road must have noticed the extraordinary amount of undulatory movement set up by passing trains—the leverage acting on the lower member of the girder. You will never notice any such oscillation when standing on Charing Cross Bridge while there are trains passing: the beam is more rigid than the cantilever. Hence, though we may dislike the effect of the railway-engineers' box or lattice girder, we should bear in mind that it is the best thing for the work to be done. I only wish that they would meet us half way, and build up a rough-dressed granite pier, or even a concrete one, and lay the girders on it. This method has been employed in some American railway bridges of which I have seen illustrations, and looks very well; certainly it is far less destructive of natural beauty than the sight of those brutal-looking black iron tubes going down into the water.

Wandsworth Bridge is an unhappy-looking mongrel structure of which the five centre spans are crossed by a lattice girder carried on cylindrical iron columns, which in this case are diversified at the top by the semblance of a monster Corinthian capital with cast-iron foliage, developing into an octagonal abacus carrying an octagonal alcove or refuge over it. The side piers are of stone, fairly well treated, with a cantilever cornice under the bed of the girder and a square pedestal over it. It dates from 1873; and is perhaps the most thoroughly

uninteresting bridge on the river; it has hardly even an interesting ugliness.

Old Battersea Bridge was a picturesque timber bridge of the same type as Putney, and perhaps inspired by it, though erected about forty years later. The builders are said to have been Phillips & Holland. It was built in a curve, the convex side facing down the river; whether it was supposed that the scour of the flood tide was stronger and more destructive than that of the ebb I do not know; my experience of the Thames would lead me to think the reverse. It was removed in the winter of 1885-6, and a record of its appearance has fortunately been preserved for us by Mr. Ernest George among his etchings of Old London. The present bridge, designed by Sir J. Bazalgette, was opened in 1890, and is a characteristic specimen of the engineering type of "handsome" bridge—I use the word "handsome" in a Pickwickian sense. It is one of the so-called arched iron bridges with a brick pier faced with granite, resting on a concrete foundation. One device used to give an "architectural" effect to this bridge is somewhat instructive. The outer arch-rib is considerably within the line of the outer face of the work, and a very large cove is carried out from it to the spandrel face. The effect of this is no doubt "very bold," but when we look at the section we find that this is simply



A little dodge at Battersea.

a piece of boxing of rivetted iron plates, strong enough to carry the outer edge of the footwalk and the balustrade, but otherwise a mere shell with a hollow space behind it. It is impossible for architects to understand why these things are done; we are too simple-minded. There seems by-the-way to have been a Moorish spirit predominating over the ornamental portions of this bridge; the spandrel filling is of Moorish foliage, and the balustrade consists of little coupled columns and pointed arches filled with alternating geometric designs. Why this outbreak in a structure which has nothing Saracenic about it in other respects is not obvious.

The Albert Suspension Bridge, designed by Messrs. Ordish and Le Feuvre, and opened in 1873, is noticeable for its admirable system of suspension rods and chains mutually stiffening each other, and maintaining a much steadier roadway than a suspension-bridge generally possesses; and in the piers there is apparent a creditable attempt to treat them in a manner characteristic of iron, in thin lines and shafts, which would have been (as usual) more successful but for the attempts at ornament in the shape of caps and finials. As an iron suspension-bridge, it is, however, an infinitely more reasonable kind of structure than Hammersmith Bridge. In the Chelsea Suspension Bridge, built by Thos. Page in 1857, we are in the midst of gimcrack again, the general style of the design being what one may call the "decanter-stopper" type, being all over finials which look like decanter-stoppers run mad. Observe the things which crown the main piers, and which, according to the scale drawings at the County Council office, are about thirty feet high altogether. These details are ugly enough in themselves, but when they are used on this scale they have of course the effect of dwarfing the scale of the whole structure. But it would be useless to waste another word on this piece of tawdriness. The plain unpretending suspension-bridge at Lambeth is really a more pleasing structure, for there the uprights for holding up the chains are plainly treated in the constructive shape best adapted for the purpose, and there is at all events no gimcrack decoration stuck on to them.

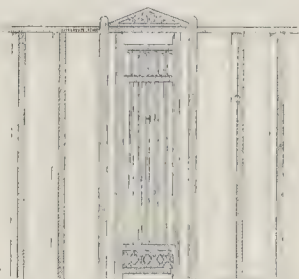
I regret that I have been unable to get any illustration of Vauxhall Bridge (opened in 1816), because it is a structure with a good deal of character, and in point of good taste and consistency it is certainly the best of the compound stone and iron bridges of London. That may be one reason for the desire to remove it; it is not "handsome" enough; but the ostensible and

perhaps valid reason is that its spans (78 ft.) are too small for the requirements of the river traffic.



Sketch of Pier, &c., Vauxhall Bridge.

There is no show or tawdriness about it; the piers are suitably and sensibly designed; the filling in of the spandrels with vertical bars as ties is in keep-



Railing, Vauxhall Bridge.

ing with the generally straight-lined character of the structure; and the balustrade railing, though simple enough, is a really admirable bit of design in cast-iron, for such a situation.* To whom the credit of the design is due is hardly precisely known, as owing to disagreements and changes it passed through several hands, Rennie's among others; the completing engineer was James Walker, but he may not have made the design actually. Looking at it, we may say with the mob in "Julius Caesar"—

"Alas! my masters,

I fear there will a worse come in his place."

Old Westminster Bridge, begun in 1738 from the designs of Charles Labelle, was at first intended to have been a wooden one, and was even commenced as such, but the more ambitious design for a stone one was carried out. It had thirteen main arches and two little ones next the banks; the centre span 76 ft. wide; nearly the same, it will be observed, as those of Vauxhall Bridge, for which it perhaps gave the gauge. The arches were semicircular, with rusticated quoins, the piers semi-octagonal on plan at the ends, on a plain cut-water. The two centre piers and two at each end had semi-domical shelters over them, which I am informed are at this moment acting as shelters in Victoria Park. It will be observed that on the other piers the supports for the lights take the same outline as these shelters. In an architectural point of view this was a fine bridge; it has figured in many old pictures; but the foundations were not well laid, and it caused much trouble and expense in repairs. The new bridge, designed by Page, was commenced in 1854. This is a bridge with iron arches carried on stone piers with a granite finish in the upper portion; in the octagonal plan of the piers there appears to be an intentional reminiscence of the old bridge. As in the case of the Tower Bridge, it was evidently supposed that the design of this structure must be governed to some extent by the great building in its proximity—in this case a modern and not an ancient Gothic structure; and as the Houses of Parliament were being erected in the Tudor style, the iron arches of the new bridge must be, if not four-centred, at least

Continued on page 146.

* The sketches here given do not profess to be exactly accurate; they are the result of hasty memoranda made on one of the recent days of almost Arctic cold, when deliberate sketching was impossible; but they illustrate the character of the design sufficiently for the purpose.

Illustrations.

EXAMPLES OF ITALIAN RENAISSANCE ARCHITECTURE.

THE four buildings illustrated this week are given in connexion with Professor Aitchison's Royal Academy lecture, and at his request.

The church of Sta. Maria delle Grazie at Milan is one of the most interesting examples that could be found of early Renaissance work in which the Medieval spirit of picturesqueness is still predominant. Professor Aitchison, we observe, refers to the exterior as being altogether Bramante's work: it has in parts a very early appearance for that attribution; another theory is that he was responsible only for the cupola; but in any case the apse is, as Professor Aitchison says, a most graceful piece of building.

The church of Sta. Maria della Salute has not been very often illustrated in its interior, though its exterior is so frequently painted, so that an illustration of the interior may be acceptable here.

The upper portion of the façade of Sta. Maria dei Miracoli is an interesting example of early Renaissance work strongly influenced by Byzantine taste, as seen in the marble veneering, the style of ornament, and the use of inlaid colour design. The naive way in which the circular openings are grouped in the pediment is curious and characteristic, but would not we think be admired if seen in a modern design.

The town-hall of Brescia ("Palazzo del Municipio"), is supposed to have been commenced by Formentone and continued by Sansovino; there is certainly a sufficient difference of style between the ground and upper stories to indicate the work of two different hands. For further remarks on it we may refer the reader to Professor Aitchison's lecture.

CONSERVATORY IN CAST- AND WROUGHT-IRON, CHESHAM PLACE.

SIR SYDNEY H. WATERLOW had some small living-rooms at the back of his house converted into a boudoir, so as to be *en suite* with the other drawing-rooms and with a conservatory opening out from the boudoir. At the same time he wanted a marble group he had bought abroad placed in a position where it could be well lit. To accomplish these two ends the conservatory was thrown out over the kitchen-court, and as the conservatory faced the street on one side and the courtyard of the Russian Embassy on the other, it was determined to make it in cast- and wrought-iron and ornamental.

The disposition of the group is shown on the plan (see next page), and the lithograph shows the view of the conservatory. An elevation of the wrought-iron railing to a larger scale is added.

G. AITCHISON.

THEATRE ROYAL, NEWCASTLE-ON-TYNE.

THE proprietors of the Theatre Royal, Grey-street, Newcastle-on-Tyne, recently decided to make very extensive alterations to this theatre, which will make it not only one of the handsomest and most comfortable, but also one of the safest in the provinces. On the ground level from Grey-street there will be a new vestibule, the external elevation of which will be of Classic design, in harmony with the old front.

On the ground level from the vestibule is entered a large and richly-decorated circular entrance-hall, from which on each side is approached by wide staircases the dress-circle, and the stalls are reached by means of staircases on each side of the proscenium wall.

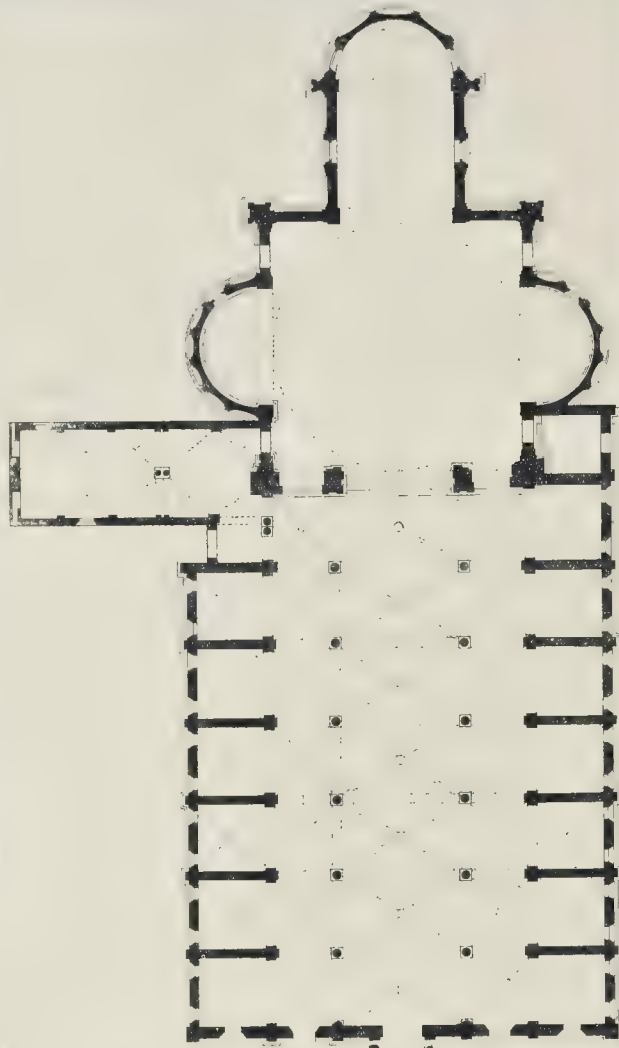
On the dress-circle level is a large and richly-decorated *foyer*, and saloons and lavatory accommodation are also provided for each tier, and everything for the convenience and comfort of the public has been provided.

The theatre will be lighted by electricity, with gas for use in case of emergency.

The seat-coverings, silk hangings, &c., will be carried out in a brown pink tone, and the colouring of the house will be in ivory and gold.

The whole of the auditorium and front of the house will be gutted and reconstructed in concrete and iron, and will, when finished, consist of four tiers, viz.:—Pit and stalls, dress-circle, upper-circle, and gallery, and will hold in all about 1,000 persons.

The interior of the theatre is of Renaissance design. The ventilation is being carried out on a simple system consisting of extracting the heated



Plan of Sta. Maria delle Grazie, Milan.

and vitiated air by means of exhausts, provision being made for allowing sufficient fresh air to pass into the building.

The whole of this construction will be fireproof, and the house will be protected with hydrants on each level and sprinklers in the roof and over the stage. Each tier is provided with two exits.

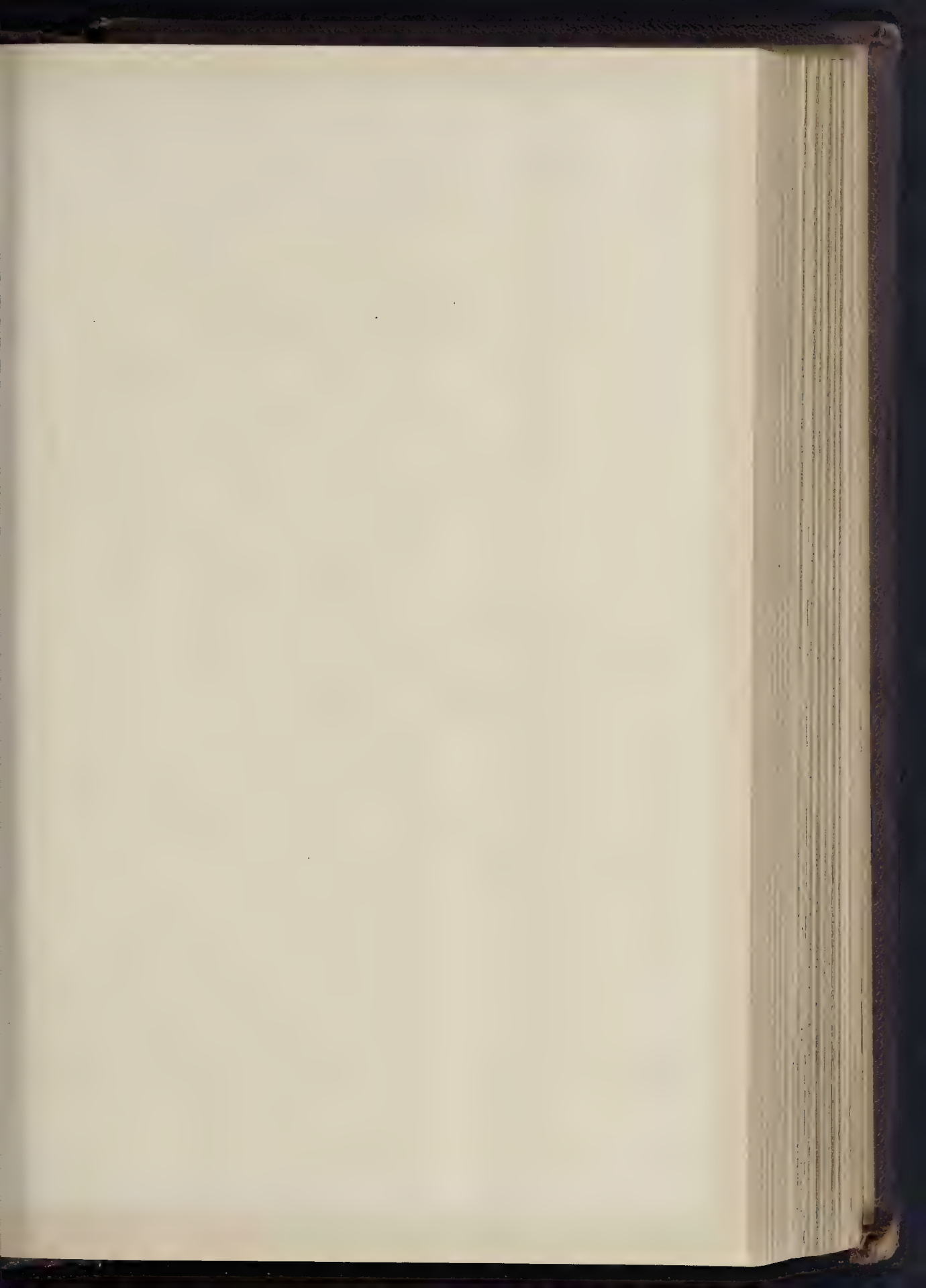
The plans have been drawn out by Mr. Walter Emden, of London, in conjunction with Mr. W. Lister Newcombe, of Newcastle, and the work will be carried out by Mr. W. C. Tyrie, of Newcastle, the constructional ironwork by Messrs. Lindsay, Neal & Co., of London, and the decorative plastering by the Veronese Co., of London.

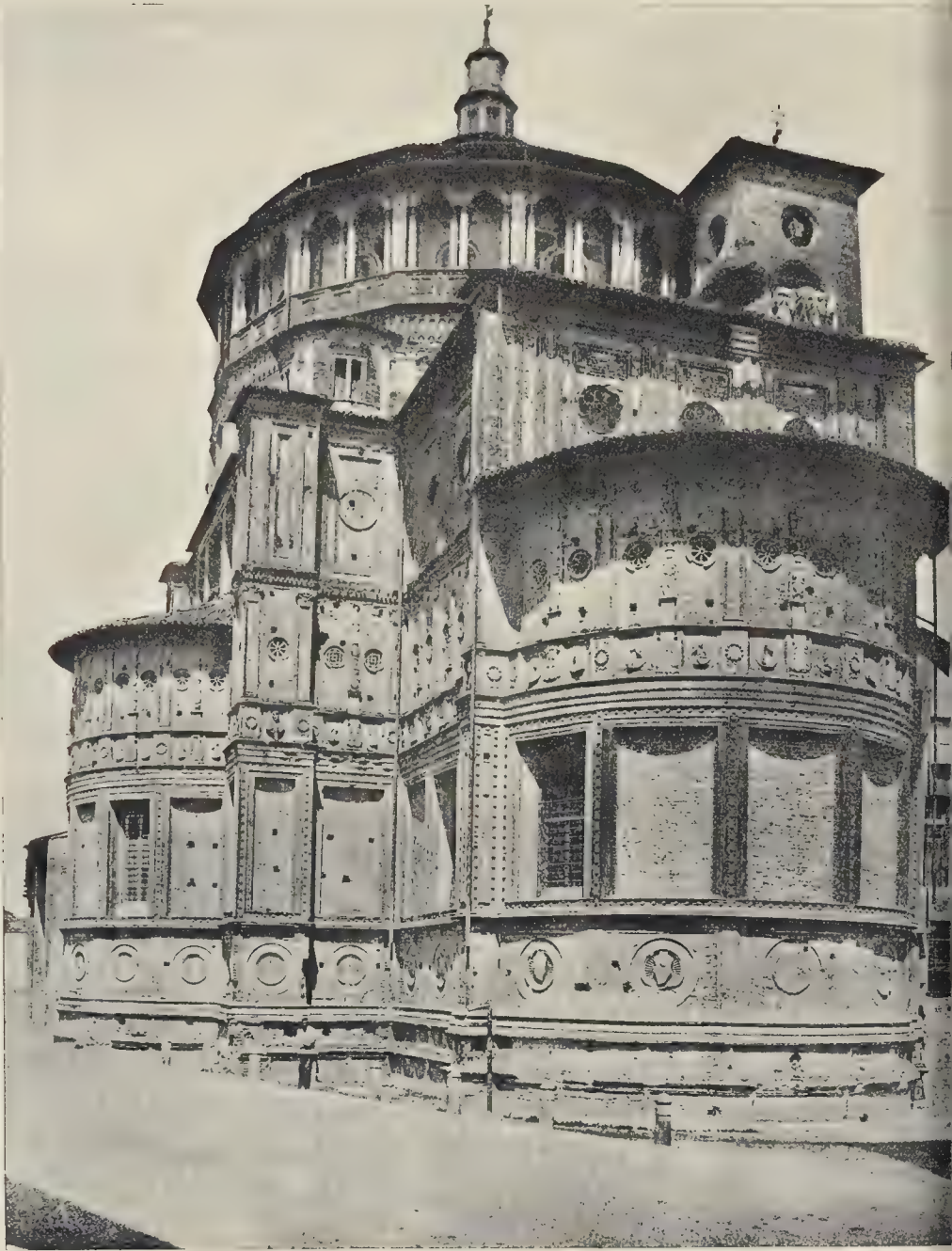
W. E.

SUTTON PUBLIC OFFICES COMPETITION.

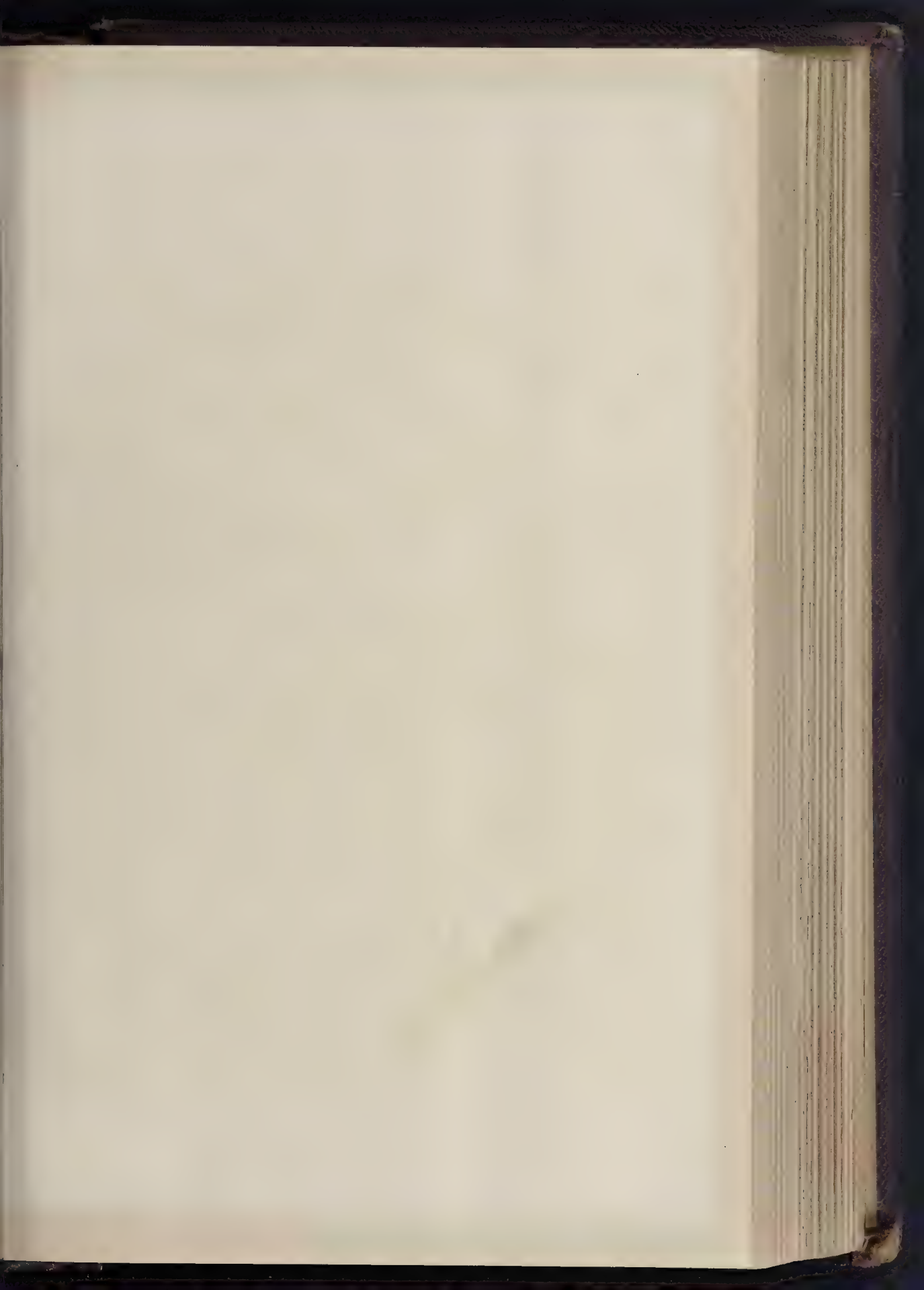
THE designs for the public offices for the Sutton (Surrey) Local Board were on public view last Wednesday at Sutton. The problem was a

somewhat peculiar one, in that the site was larger than required for the proposed buildings, and was only to be partly covered, the remaining portions being left for a future free library, magistrates' court, and police-station, while a frontage for shops was to be left on the main road. The conditions were drawn up by Mr. Albert D. Greatorex, C.E., the Local Surveyor and seem to clearly define the requirements. The design placed first by Mr. Phene Spiers, F.R.I.B.A., who has acted as the assessor, is by Messrs. Curry & Tatlock, of Sutton. The merit of this design seems chiefly to lie in the general distribution of the block plan, by which the condition of obtaining the greatest possible frontage for the land to be let as shops has been carefully borne in mind, 119 ft. being left towards the main road for this purpose as compared with 75 ft. in the design placed second. The principal weakness in the plan lies in the imperfect lighting of the surveyor's clerk's office, as also in the lecture-theatre to the Tech-

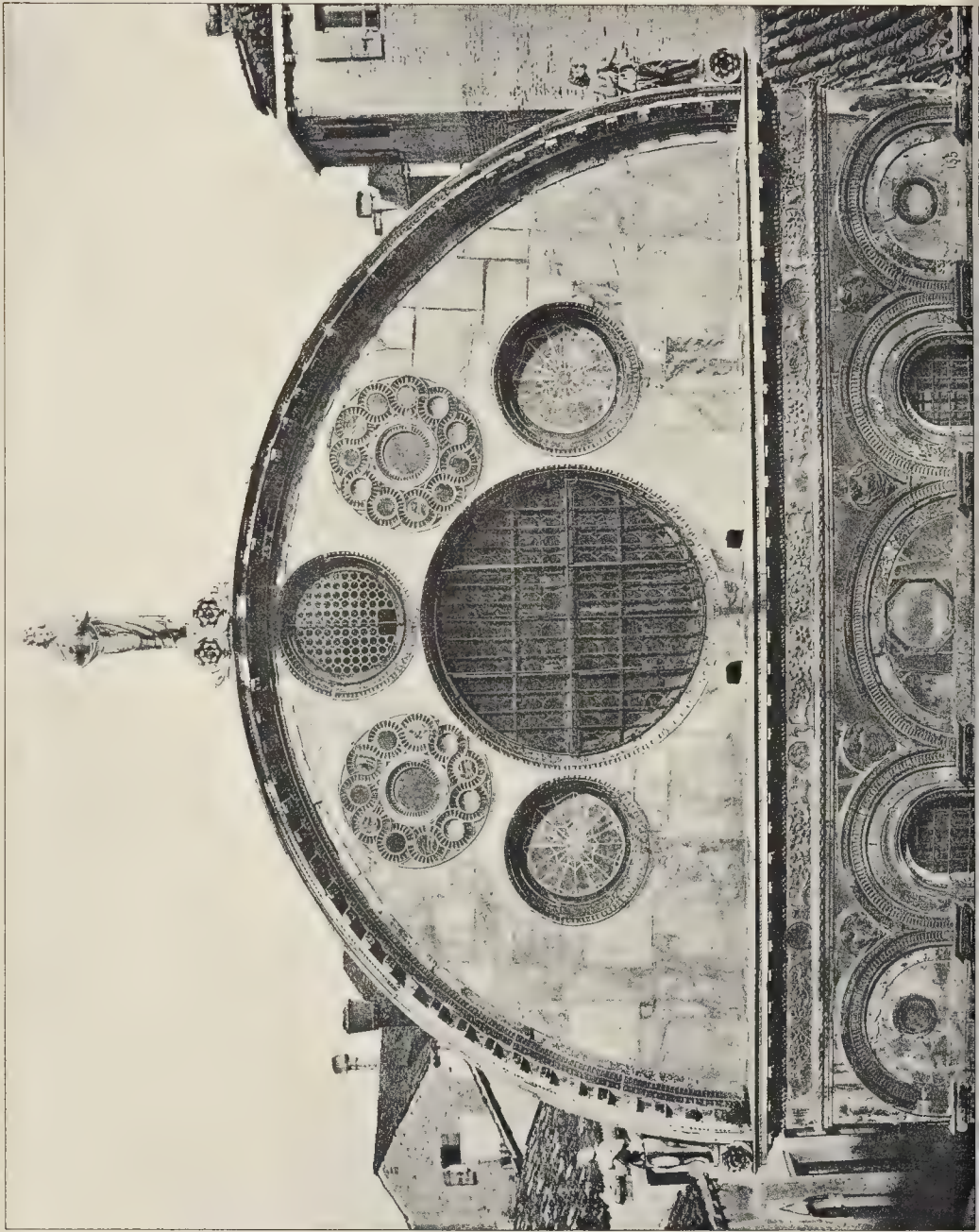


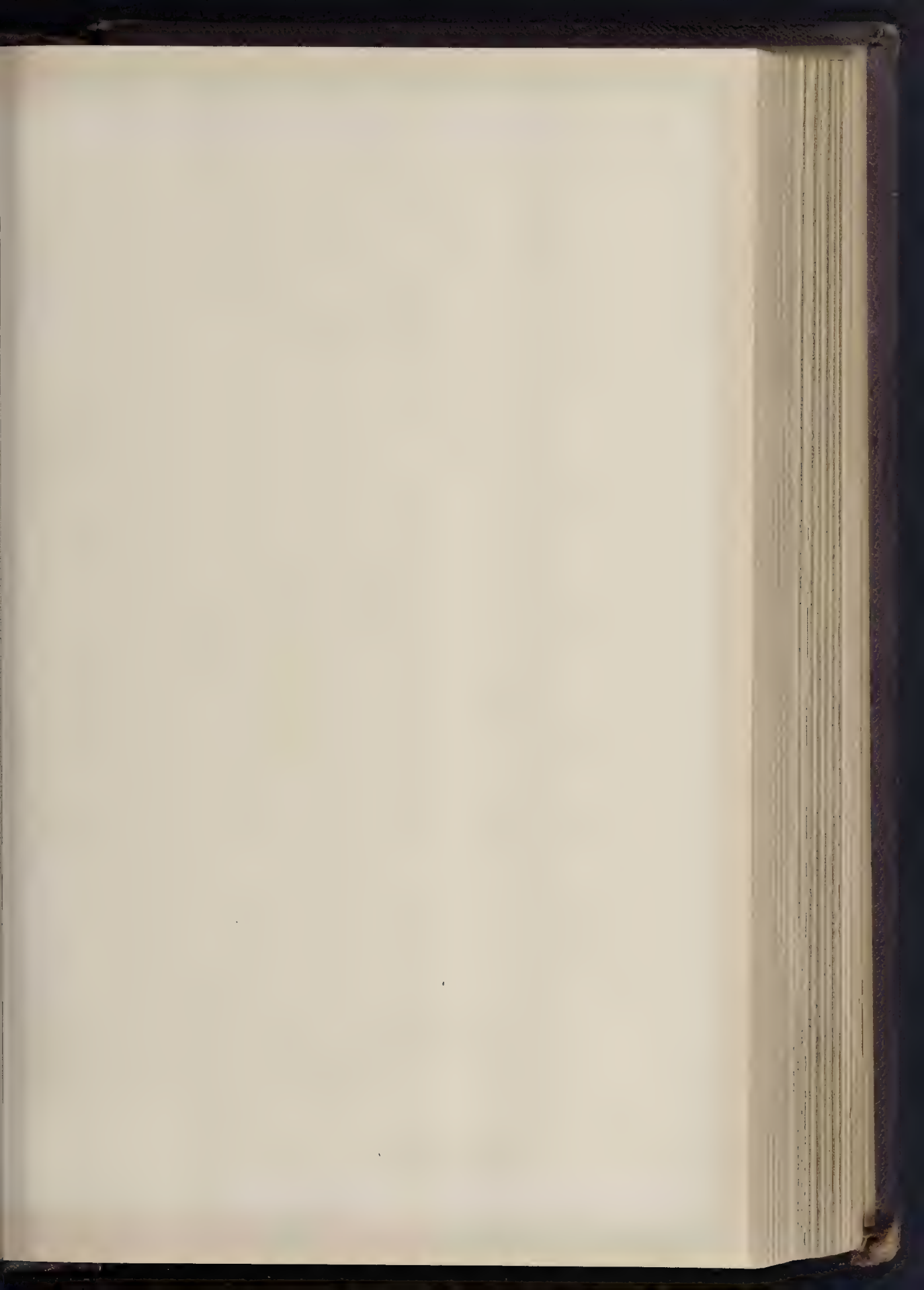


STA MARIA DELLE GRAZIE, MILAN — DESIGNED BY BRAMANTE (1493-1492)
(See also Illustration in *The Builder's Library*)



THE BUILDER, FEBRUARY 23, 1895.

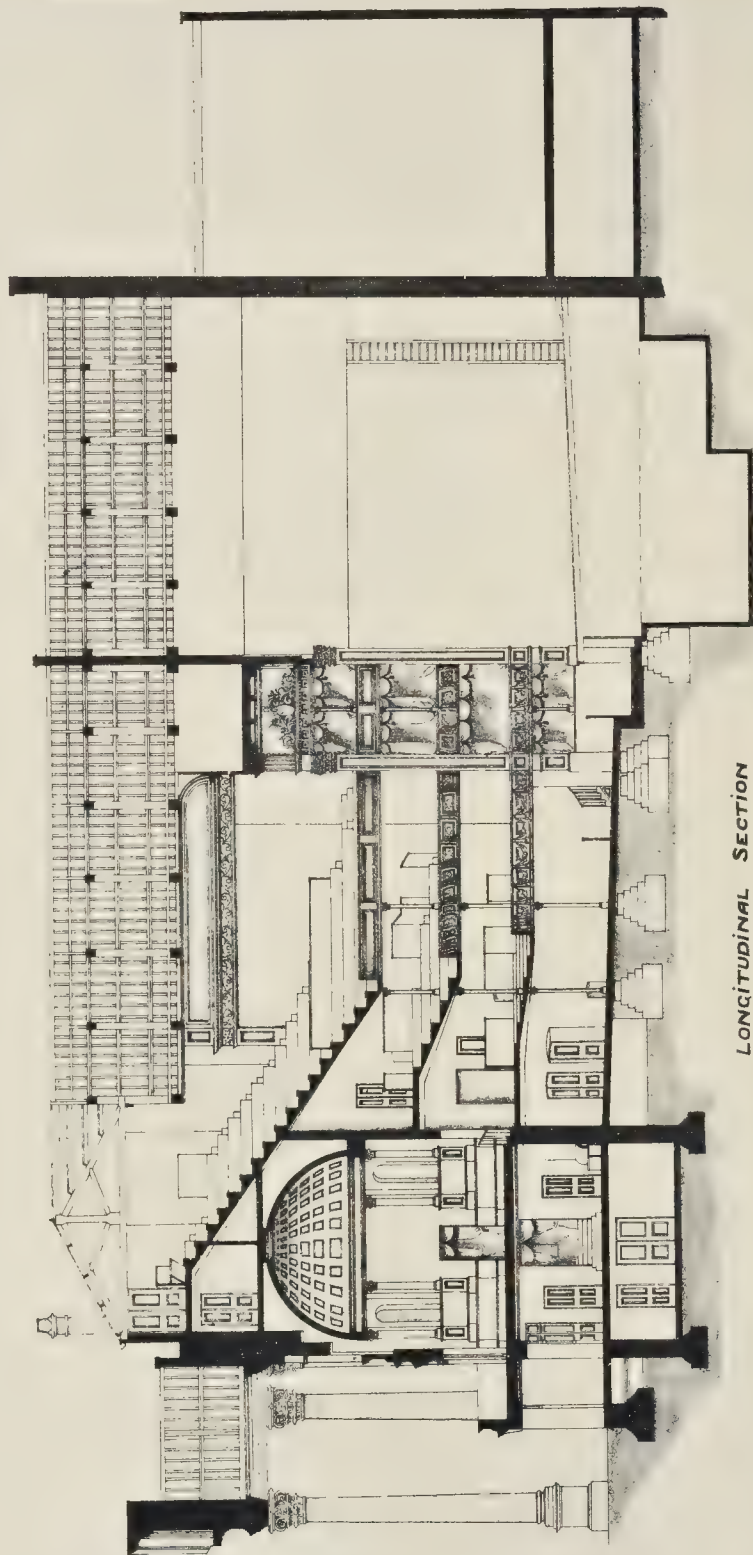




THE BUILDER, FEBRUARY 23, 1895.

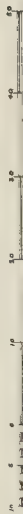
**THEATRE ROYAL
NEWCASTLE ON TYNE**

WALTER EMDEN
JOINT ARCHITECTS
WLISTER NEWCOMBE



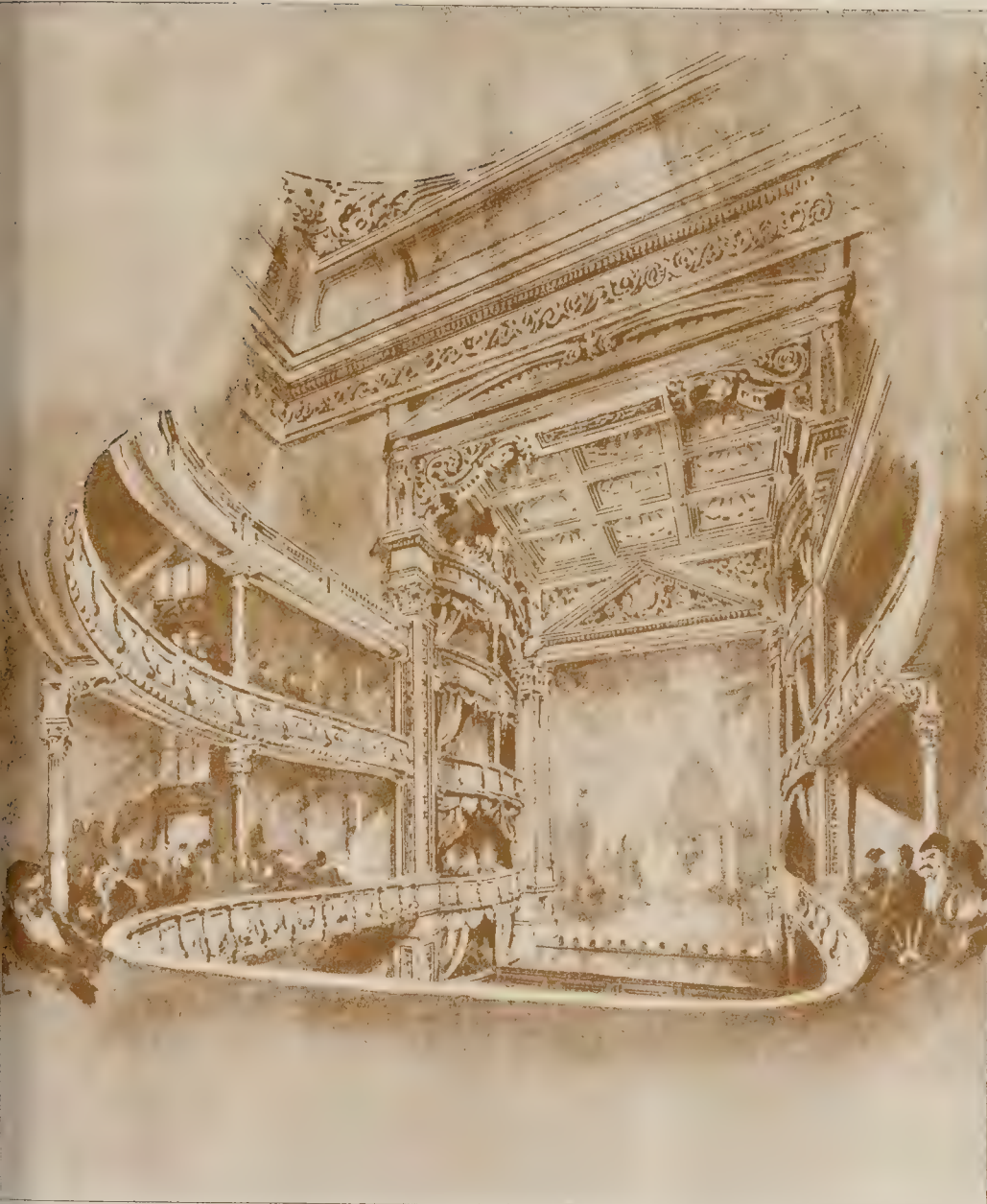
LONGITUDINAL SECTION

SCALE OF FEET





CONSERVATORY 20 CHESHAM PLACE S.W. MR. G. MITCHELL, A.R.A., ARCHT.



INK PHOTOGRAPH. L. E. A. 4 & 5, EAST HARTING STREET, PETERBOROUGH.

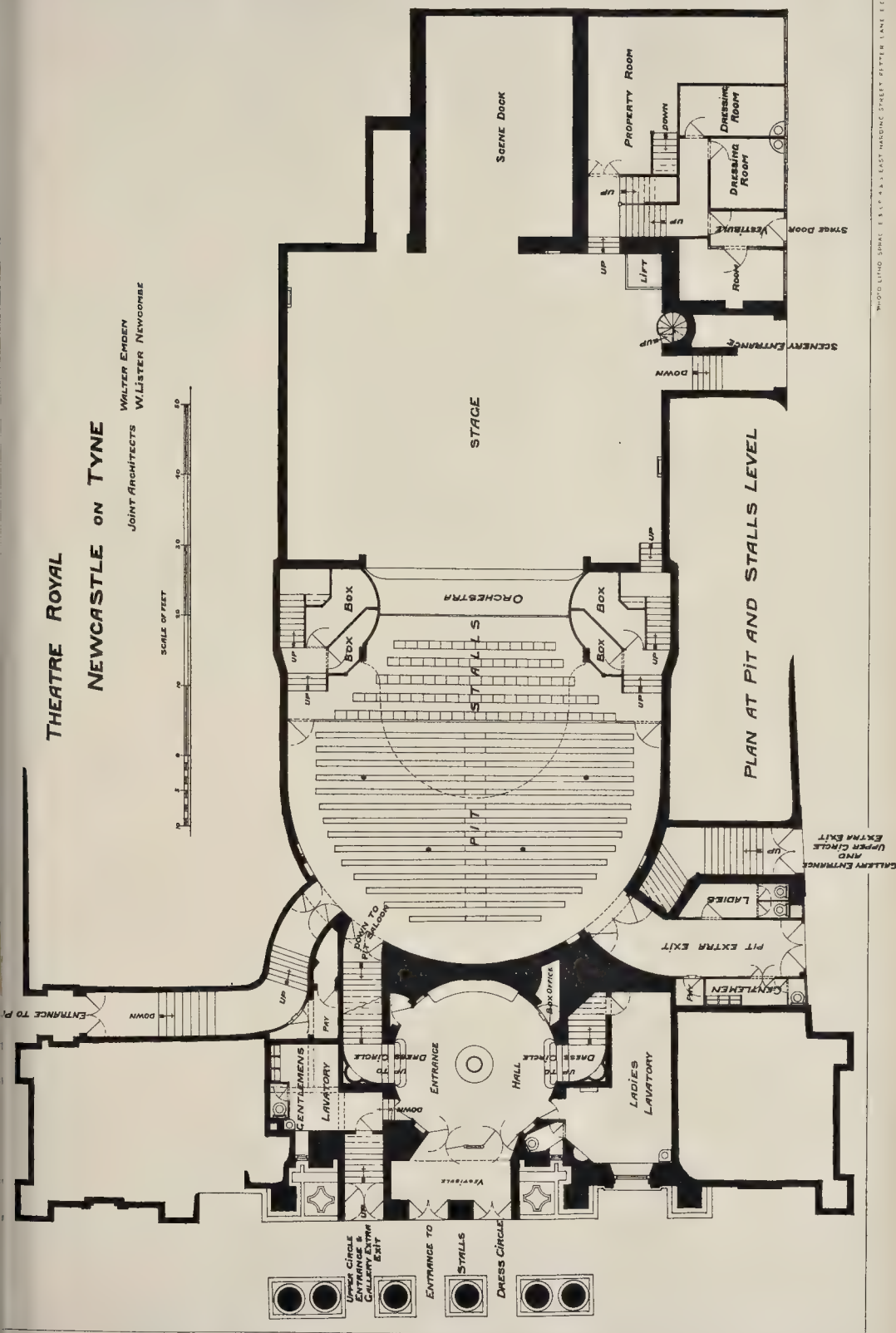
THEATRE ROYAL, NEWCASTLE. SKETCH OF INTERIOR.—MESSRS. W. EMDEN AND W. LISTER NEWCOMBE, JOINT ARCHITECTS.

THEATRE ROYAL

NEWCASTLE ON TYNE

WALTER EMDEN
JOINT ARCHITECTS
WILFRED NEWCOMBE

SCALE OF FEET



WALTER EMDEN ARCHT. & WILFRED NEWCOMBE ARCHT. SHEET FIFTEEN (ANT. 11)



INK PHOTO SPRAGUE & CO. 4 & 5 EAST WARDING STREET, LONDON, E.C.

FAÇADE OF MUNICIPAL BUILDINGS, BRESCIA. DESIGNED BY FORMENTONE (1508)

(Given as Illustration to Professor Atchison's Lectures.)

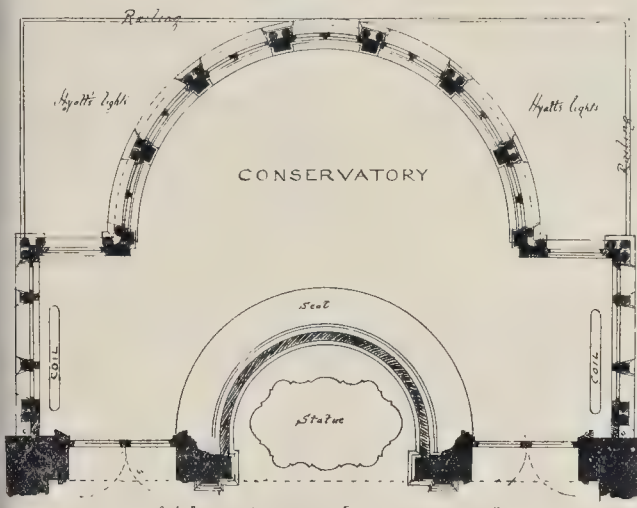


INTERIOR OF STA. MARIA DELLA SALUTE, VENICE.—DESIGNED BY BALDASSARE LONGHENA (1632).

(Given as Illustration to Professor Aitchison's Lectures.)



Conservatory, Chesham Place.—Detail of Railing.



Plan of Conservatory, Chesham Place.

nial Institute, over which are placed the classrooms. This lecture-theatre is only 15 ft. in clear height. The partitions to the class-rooms over this theatre are carried on a girder supported by columns as shown in the section. These columns, however, do not appear on the plan.

The uncovered ground left for the magistrates' court and Free Library is very small, and would probably not be sufficient. The elevations are in an ordinary type of red brick and stone mullion treatment, and the authors estimate their design to cost 8,910*l*. The design placed second by the assessor is by Mr. H. T. Hare, and, although perhaps slightly inferior in plan to the selected one, is far superior to it in design, being executed in a very pleasing phase of red brick walling and stone mullions. In point of price Mr. Hare's design is estimated at 900*l*. less than the pre-miated competitors. The plan is very much broken up, however, and lacks a certain amount of dignity in consequence. The draughtsmanship exhibited in these drawings contrasts strongly with the badly-drawn elevations and perspective of the design placed first. Among a large number of other competitors, we notice especially the design of Messrs. Marshall & Bradley, who have adopted a red brick and tile treatment, quite in keeping with the locality. The distribution of the site adopted by the Local Board forced the competitors to produce a number of isolated designs, rendering it difficult to form an impression of what the small two-story blocks would look like. In this

respect mention may be made of Messrs. Archer & Hooper's design, which is ambitious and comprehensive, and covers the whole site with a symmetrical treatment in each elevation.

We might say, in conclusion, that we trust that other Local Boards will not follow the example here held out of relegating their public buildings to the rear of the site in order to make money by the letting of the frontage as shops.

THE ARCHITECTURAL ASSOCIATION SPRING VISITS:

PAVILION THEATRE, MILE END.

THE second of the Spring Visits took place on Saturday last to the Pavilion Theatre, Mile End, E., when a party of about eighty members assembled and were met by the architect, Mr. Ernest Rüntz. The theatre itself has a history. It was originally erected on the present site in 1827, it was burned down, however, in 1856 and reopened in 1858, having been rebuilt from the designs of the late Mr. Donald Munro. Of the present building, designed by Mr. Rüntz, we gave some particulars not long since (*Builder*, December 22, 1894, page 460), and therefore it is hardly necessary to repeat them here. We may add, however, that the level of the pit and stalls has been altered, the rake of the floors being specially studied so that each spectator can see well above the heads of the persons in front. In

regard to this point we may notice that the floor of the stalls rises 1 in 10, the pit 1 in 8, while the stage itself rises 1 in 10. The average seating is taken 2 ft., centre to centre, and 1 ft. 6 in. wide, the reserved seats and circle being, however, slightly in excess of this.

After the party had made a detailed inspection of the building, the architect, Mr. Rüntz, kindly entertained the members at tea, after which, on the proposition of Mr. Banister F. Fletcher, jun. hon. sec., a hearty vote of thanks was passed to Mr. Rüntz for his kindness in showing the members over the building.

ARCHITECTURAL SOCIETIES.

CARLISLE ARCHITECTURAL, ENGINEERING, AND SURVEYING SOCIETY.—On the 13th inst. a paper on the "Manufacture of Iron and Steel" was read by Mr. A. Wilson, at the Town-hall. The lecturer described first the sources from which iron is derived, and remarked that pure iron is scarcely ever found in nature, though it forms in various combinations one-twelfth part of the earth's crust. The antiquity of its use is shown by many records of ancient and scriptural writings, and Asia probably made more iron two thousand years ago than it does to-day. The various ores of iron, hæmatite, magnetite, limonite, and siderite, and the class of ores known as ironstones, which is the basis of the greater part of the industry of Great Britain, were treated of, with details of their chemical composition. The reduction of iron from the ores was then explained, the construction of blast-furnaces being demonstrated with an explanation of the chemical changes taking place therein. The action of rolling-mills and steam-hammers on the crude iron was then shown to have a very great effect on the ultimate strength of the metal. Passing on to steel, the lecturer described the difference between it and wrought-iron, explaining that steel was without the fibrous character of wrought-iron, which latter contains small grains of various impurities embedded in its fibres, while those impurities were entirely absent in steel, thus making it stronger and more uniform in composition. The different methods of steel-making were described in full, a very clear description being given of the difference between the basic and acid methods of Bessemer steel-making. After some discussion, a vote of thanks to Mr. Wilson concluded the proceedings.

NORTHERN ARCHITECTURAL ASSOCIATION.

—A meeting of the Northern Architectural Association was held on the 13th inst. in the Art Gallery Meeting Room, Newcastle, the President, Mr. Jos. Oswald, being in the chair. The President presented the prizes to the successful competitors who submitted sketches and drawings made during the summer of 1894, as follows:—Best set of sketches—First prize, Mr. G. C. H. Crawhall, Newcastle (two volumes of Fergusson's "Ancient and Mediæval Architecture"); second prize, Mr. R. P. Twizell, Newcastle (Oakeshott's "Italian Details"). Measured drawings—First prize, Mr. S. M. Mould, Gosforth (two volumes of Colling's "Gothic Architecture"); second prize, Mr. G. Brunell, jun., Morpeth (Colling's "Mediæval Foliage" and Rosengarten's "Architectural Styles"). Mr. J. W. Twist, A.R.I.B.A., of Leeds, then read a paper on "Ecclesiastical Architecture of Yorkshire," illustrated by sketches and limelight views.

ARCHITECTURAL SECTION, GLASGOW PHILOSOPHICAL SOCIETY.—A meeting of the Architectural Section of the Philosophical Society of Glasgow was held on the 18th inst. in the rooms, 207, Bath-street. Mr. Watson presided. A paper was read by Mr. Richard Ferrie, sculptor, on "The Relation of Modelling to Sculpture and the Industrial Arts." The lecturer, after a short reference to ancient Greek work and that of the Renaissance, directed attention to the subject of the connexion of modelling with sculpture and the decorative arts of the present day. He advised the use of modelling to assist the stone or wood carver in his productions, and described the advantages of clay as a material for the production of design. After describing the capabilities of terra-cotta as a decorative material, and noting its use, or rather want of use, in Scotland, the lecturer dwelt on the merits of plaster for the production of modelled work. A number of lime-light views were shown illustrative of the connexion of modelling with work finally produced in bronze, marble, stone, wood, and plaster.

STUDENT'S COLUMN.—Owing to the pressure of other matter in this issue, our Student's Column article is held over until next week.

Continued from page 143.

three-centred arches, with a quick curve at the springing. But engineers, unapplying, will never have done shamming in these matters, and the apparent three-centred arches, which come up with a charming curve off the piers (the line is continued downward in the piers with a slightly reversed curve), are not the real construction, they are only a corbelled-out pretext; the real constructional arch-ribs continue the main curve behind them on to the centre of the piers, where they meet each other on a common skewback of metal. I am glad to say that the bridge has revenged itself on the engineer in a sense, for it is owing to this meeting of the iron arches that the traffic causes such an oscillation on Westminster Bridge, the disturbance being communicated from one arch to another; and when Blackfriars Bridge was built, the engineers, taking warning by this example, took care to carry up the stone piers solid between the iron-work. It must be said in regard to Westminster Bridge that there is nothing obtrusively vulgar in its detail; its general appearance is graceful if we could only forget how superficial is that gracefulness; but for a bridge over a historic river, at such a historic place as Westminster, it is but a poor weak concern, quite unworthy of its associations, and in an architectural sense there is no question that the bridge which preceded it was far superior to it.

We may pass over Charing Cross railway bridge, to which reference has already been made, but a word is due to the memory of old Hungerford Suspension Bridge, which occupied nearly the same situation, and was a good specimen of work of its kind, with towers of an Italian campanile style, rising from massive cut-water piers. It represents the same kind of quiet unobtrusive Classic treatment as old Hammersmith Suspension Bridge, and like that, was at all events unobjectionable in point of taste. Brunel was the engineer; the bridge was commenced in 1841, and completed in 1845; the centre span was 676½ ft. The chains and portions of the other materials are now doing duty in the form of Clifton Suspension Bridge, the making of which, commenced in 1836, had stopped half-way for want of funds, and it was only by the cheap acquirement of the *disjecta membra* of the Hungerford Bridge in 1862 that the completion of the Clifton Bridge was effected.

It is indeed a contrast to pass from the graceful but weak and illusory structure at Westminster to the monumental erection which was commenced in 1811 under the proposed title of "The Strand Bridge." But while the masons were yet at work, England had taken share in actions which stirred the pulse of the whole world, and the new bridge, opened in 1817, was destined to be christened with the undying name of "Waterloo." It was fitting that the memory of an event which signified the rise of modern England to her highest point of power, pride, and glory—such a height as perhaps we shall never reach again—should have been associated with a structure so grand and monumental in character, so entirely without littleness or tawdriness, as Waterloo Bridge. It was an erection worthy of a conquering nation, as we then were. As already hinted, it is open to criticism as a design. It shows the illogical use of the columnar order as a decoration to the piers: at the same time the massive Doric order made use of is less objectionable and more in keeping with the situation than many other examples of similar treatment. It has the lamp-standards on the crown of the arch instead of over the piers, with a solid blocking, interrupting the open balustrade, to place them on; but then it may be urged that the whole structure is of such massive character that such a thing as a lamp-standard is a toy that may be placed anywhere, and that the mass of blocking over the keystone even enhances the general aspect of solidity. Whatever we may think on these points however, we must admit that Waterloo Bridge is a noble example of that quality of unity and simplicity in architecture which was the subject of discussion in this room a few nights ago. The engineers were the two Rennies, father and son, who were a few years later to distinguish themselves yet more by the even finer structure of London Bridge.

Old Blackfriars Bridge, commenced in 1760 from the designs of Robert Mylne, one of the famous Scotch building family of that name, was a fine structure, at once picturesque and dignified, of somewhat similar character and proportions to old Westminster Bridge, though differing in detail. It consisted of nine elliptical arches. Gwynn, who produced a design in competition with Mylne, proposed circular arches; and Dr. Johnson, who knew as much of the matter as an

owl, defended Gwynn's design in three letters in the *Gazetteer*,* his motive being, no doubt, that Mylne was a Scotchman. The arches had massive quoins, the rusticated joints of which were carried in straight lines across the soffit of the arch. The piers were decorated with an Ionic order in coupled columns, which perhaps gave the hint for the coupled columns on Westminster Bridge; two of these columns are, I believe, still in existence in London.

It is curious that, as the bridge had a considerable rake from the centre, and the cut-waters carrying the base of the columns were at the same level, the columns were diminished in height as they approached the bank, a procedure which must have produced a rather clumsy effect, and is oddly out of keeping with the reverence for the proportions of the order which usually prevailed in the last century. Still, in the main, this was architecturally a most pleasing bridge to look at, though, unfortunately, it seems to have been very badly constructed, and after extensive and costly repairs in 1833 and the following years, it was pulled down in 1864 to make way for the present bridge, a structure typical of the "handsome" type of modern bridge. Here the misuse of the column as an ornament to the pier came to a climax. Look at sketch A and it is obvious that such a massive



granite column is adapted to carry a great weight over it; look at B and see what it really carries. The details belong to the school of what was once unkindly called "Manchester Gothic"; the balustrade is a pretentious thing of twisted colonnettes and trefoil arches; the cross-bracing in the spandrels of the girders is ingenuously picked out with gilt stars. Everything is designed to produce a character of showiness and glitter. It is almost pathetic to find that there is a *motif* in the carving of the Broddingnagian capitals; those on the west side of the bridge are carved with representations of river plants and birds, those on the east side with seaweed and fishes. Apparently those who were responsible for the design fancied they were producing a work of art. But to think that the same city that built Waterloo Bridge with acclamations could in half a century have come down to this!

Southwark Bridge, built in 1814 from the designs of Rennie, is a structure which hardly receives the attention it deserves; for a composite stone and iron bridge it is not badly designed; the stone piers are well and solidly treated, and the arch is remarkable not only as being, I believe, the first iron arch built on that scale, but as being of cast-iron and a genuine arch, not a truss. The vousoirs of course are not of the proportions which must be employed for stone; they are much longer than their depth, since iron vousoirs can be held in their place in a manner which cannot be done with stone; they are cross-braced laterally, and have a covering-piece at the joints; but they act as a rigid arch in compression, and

the roadway under heavy traffic seems as firm as the solid ground. Any one who will go down the steps at the side and take a close look at the arch from that point, will, I think, be impressed with it as a grand and fine piece of work. The treatment of the heavy cast-iron parapet railing, very simple in design, is good, another akin to that of Vauxhall Bridge: and the lamp standards, as a piece of design in cast-iron, are certainly above the average.

We now come to the bridge *par excellence* known from almost the earliest times of English history as "London Bridge," and which perhaps in regard to its history, the picturesqueness of its ancient appearance, and the grandeur of its final development, may be called the most interesting bridge in the world. According to Mr. Wheatley, there was probably a bridge on the site in Roman times, and certainly a wooden one existed before the Norman conquest. The historical London Bridge, of stone, was built on pile between the years 1176 and 1209, and the original construction, or a great portion of it, appears to have existed till it was removed after the building of the present bridge, though it has been patched, repaired, and altered at various periods to such an extent that at last little of its old appearance can have remained. Had an painstaking and learned archaeologist presided over its demolition, it is possible that its whole architectural history might have been traced out from its own remains, in the process of taking it to pieces; but no systematic study of this kind seems to have been made. We do know positively however, that its history was continuous; there was no complete removal and rebuilding from the time of Peter of Colechurch, who is credited with the design and building of the original bridge, to the time of Rennie. Considering that the piling was probably not very scientifically done, and that the bridge was for centuries loaded with houses hanging on to it and projecting far over the water, it is extraordinary that it managed to stand for so long. The centre pier was lengthened out on each side in order to form a foundation for the chapel of St. Thomas Becket in the centre of the bridge. The first illustration I will show you is from a print in the Crace collection, copied from an illuminated MS. in the British Museum, and which professes to represent the bridge in the reign of Henry VII., about 1500. The details of course must be taken *à grain*, as the illustration naturally does not show them fully, and we have to allow for the engraver's translation also. It shows the chapel of the centre pier, which, however, from the architectural indications, must evidently have been rebuilt since the period of its foundation. Although the bases of the piers, or the wooden "starlings" protecting them, are not shown here of the immense size which in latter days they are known to have been, there was evidently at this period the cataract arising from the choking up of the water at the higher level, which is a feature in almost all views of the old bridge. As far as I have observed, this cataract in old representations is invariably shown as on the east side of the bridge, though it would seem probable that at the top of high water the drop must have been to some extent in the other direction. This throttling of the tidal flow by the piers, which involved great danger to boats passing the bridge, was not without certain compensating advantages. It is said that one of the causes which hastened the dilapidation of Old Blackfriars Bridge was the increased scour from the tide after the removal of Old London Bridge; it is certain that the occasional flooding of the low-lying districts of Lambeth was in some degree a consequence of the removal. During a considerable portion of the sixteenth century one of the great sights in connexion with the bridge was the sumptuous timber erection called "Non-Such House," towards the City side of the bridge, which is shown, together with a representation of the general aspect of the bridge, in Mr. Brewer's drawing of London Bridge at that period.* It was probably burnt in the fire on the bridge in 1632. A very naive engraving in the Crace collection gives a kind of side elevation of the bridge with its irregular groups of houses, and the river labelled "Tamesis Fluvius, vulgo Temms;" and an engraving of considerably later date in the same collection gives a good idea of the appearance of the bridge before the houses were removed. Great alterations were made in the bridge in 1758, under Mr. George Dance, the City Clerk of Works, when the houses were removed, the roadway and parapets new formed, and a wide centre arch made. This aspect the bridge retained till

* Wheatley's "London, Past and Present."

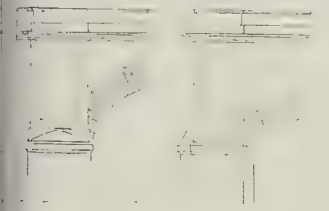
* Published in the *Builder* of May 10, 1884.

demolition, as shown in the drawing by Major Yates, in 1823. This is taken on the west side, and shows smooth water there; but the old danger from the rush below the bridge still remained. An enlarged view of a portion of the Southwark end, taken during this period, is interesting as showing the patchwork of various styles and dates, the old cut-water piers, and the immense timber "starlings," filled up with stones, which were constructed round them to protect them from the stress of the tide; it also shows the Medieval treatment of the soffit of the arch in groins, of which mention has already been made.

All this patching, however, did not avail to prolong the life of the old bridge much, and the present one was commenced in 1824 from the designs of Rennie, and carried out by his son Sir John Rennie. It was built somewhat to the westward of the old one, which was left standing till its completion (it is curious that when the place of a bridge is shifted in this way, it is always to the westward). It consists of five semi-elliptical arches, the whole of granite, the piers standing on timber platforms on piles about 20 ft. long.

Rennie says, "The great magnitude and extreme flatness of the arches demanded unusual care in the selection of the materials, which are of the finest blue and white granite from Scotland and Devonshire."

London Bridge is a structure one cannot speak of without enthusiasm. The late Mr. Street, speaking from the chair in this room, referred to it as "a sublime bridge," and it merits the phrase. It is nearly faultless. Not only is it a grand piece of construction, but there is nothing little or false in any way in its architectural treatment. The piers are simple projections, with no pretence of columnar treatment. Everything about it is grand, simple, and massive style. The only criticism I ever met with against it is that the archvoussoirs disappear behind the line of pier instead of resting on a visible impost. With an elliptical arch this could, of course, only have been avoided by proportionally widening the piers, as it springs



vertically. That is, perhaps, the sole advantage which a segmental arch has over an elliptical one; you can show its abutment completely without wasting masonry. But I think the elliptical line has advantages which more than counterbalance this.

The history of the Tower Bridge is fresh in all our minds. The necessity for a new bridge lower down than London Bridge, together with the equal necessity of not stopping the shipping traffic, has led to a grand mechanical contrivance which in itself is worthy of all admiration, and has been admirably carried out. Unhappily, it was predetermined that the Tower Bridge must be "architectural"; moreover, "it was to possess an architectural character which would be in accordance with that of the Tower of London itself."

In fact, at one time it was stipulated by the Tower authorities that a castellated fortification at the north abutment should form part of the undertaking. Observe the extraordinary reasoning here. Because there was a genuine Medieval structure on the bank of the river—all that Mr. Shaw-Lefevre has left of it, that is to say—therefore there was to be a sham Medieval structure on the river. It is something too preposterous for argument; and shows that the Corporation authorities are even behind their own generation, stupid as that is for the most part in regard to architectural questions. The design made by Sir Horace Jones, however, of which the drawing has been kindly lent by the City Surveyor, though there is great want of simplicity and concentration even about that, is superior to the one that has been elected in that it is somewhat more simple, and (more important) that it is what it professes to be; it is a solid masonry tower carrying the ends of the high-level bridge and the attachment of the suspension chains. As a design it is weak in two respects. There is too much detail in the lower portion—balconies, windows, &c., which

interfere seriously with the massiveness of effect which is desirable in such a case. What one wants is a plain mass of solid masonry up to the bearing point, and then, if you like, a decorative crowning stage over that. There is also the old defect that the suspension chains appear to be affixed into the masonry, as we know they could not possibly be; a fatal error which is repeated in the design carried out. As to this latter, the engineer appears to have come to the conclusion that it was impossible to build stone towers strong enough to sustain the chains, and that therefore steel must be resorted to. Now considering that the pull of the chains really comes on the girders of the high-level bridge, which form an immense tension-bar, it is impossible to accept such a conclusion. The simple architectural treatment would have been to treat the high-level bridge as a girder resting on the stone towers, to have brought it through the towers on roller-beds (to allow for any movement from expansion and contraction), and to have attached the chains visibly to it on the landward side. We should then have had a construction perfectly simple, and which would have fully explained itself. Instead of that, having decided that the towers must be constructively of steel, it seems to have been resolved nevertheless (perhaps it was felt obligatory) to carry out the original condition that the design was to be such as to harmonise (save the mark!) with the architecture of the tower. Accordingly the steel piers were clad with stone-work, which outwardly simulates the aspect of a solid stone-tower. The full extent of the make-believe in this is not to be appreciated in the present aspect of the structure. When I went over the work shortly before its completion the construction was nakedly visible to some extent, and the whole height of the side walls of the tower was seen standing on the cross-tie of the steel construction, with empty space under it. I could really hardly believe my eyes when I first saw this. Even in regard to outward appearance, supposing the stone towers were solid constructions, the design has been much deteriorated and weakened in comparison with Sir Horace Jones's by the greater amount of detail crammed into it, and the further weakening of the vertical expression of the stump of the tower by surrounding it with successive bands of decoration dividing it into stages of nearly equal height. The gateway approaches, taken by themselves, are much better than the towers, and are pleasing bits of architectural design, but they are rendered ridiculous by the device of apparently running the great suspension-chains over them, which they are to appear to support, although we know that the action of these chains, if so supported, would make the stone-work to pieces in a short time. The whole thing, as far as architectural expression is concerned, is the most colossal piece of architectural gimcrack that has ever been seen. Though I would have much preferred the solid stone towers intended by Sir Horace Jones, it would have been far better to have shown a naked steel structure than to have perpetrated this extraordinary piece of sham architecture, in which what appears to be the supporting construction is really the supported. And, in fact, the steel structure would have been, in the true sense, much more in harmony with the Tower than the present structure. It would have shown how civil engineers construct in the nineteenth century, just as the genuine ancient portions of the Tower show how military engineers constructed in the early Medieval period.

What will be done with the next new bridge we cannot conjecture, for the County Council declined to lend or divulge the design for it for this occasion, though I was given to understand that they might have done so had the design been determined on; but it appears that it is still under consideration. They might, perhaps, have done worse than take the opportunity of getting the opinion of an assembly of architects on the merits of alternative designs.

The summary of the matter is that down to the early part of this century engineers could and did produce bridges which were characterised by grand, simple, and impressive design. They apparently cannot do so now, and the principal reason seems to be that they have abandoned simplicity and are constantly bitten with the idea of producing handsome and showy erections, and bedazzling them with so-called architectural detail which they do not know how to design or how to apply, and apparently nothing will induce engineers to believe that any special study is requisite to know how to do so. When a proposal was made some years ago that architects should be called on to design bridges in collaboration with engineers, I remember a letter being

published from an engineer saying contemptuously that "engineers were not going to put themselves into architectural harness." Then will they at least have the goodness to let architecture alone? I really think we have some right to lecture the engineers on this point, for if architects have not all the constructional knowledge possessed by engineers, they know the value of such knowledge, and they know where they are deficient; but the engineers are entirely blind to their own deficiencies as to design. The position is pretty well represented by the story of the young dandy of small mental development, who said in a melancholy tone, "Of course I am a d—d fool, and I know it; but my brother Tom is a d—der fool than I am, and he doesn't know it." In France it is the universal custom, when a statue is to be set up to some eminent man, that an architect is associated with the sculptor to design the pedestal or other architectural surroundings. It would surely be as reasonable that in bridge building an architect should be associated with the engineer to design the portion above water, or at least to supervise the decorative details. But if we are met, as I know we should be by many, with the sneer that we "want a share in the job," I should reply that we are quite content to leave it all in their hands, if they will take such engineers as Rennie for their model, and be content to build simple bridges instead of attempting handsome ones.

The author of the foregoing paper wishes to express his thanks to Mr. Wonnacott and other members of the "A.A. Camera Club," who undertook the photographing of the views of old bridges, now removed, which are preserved in the Grace Collection; and also to Mr. Drummond-Milliken, who kindly saved him a good deal of labour by looking up for him the dates of erection and names of the builders of the various bridges mentioned.

The President, in inviting discussion, said that the paper they had listened to was a very enjoyable one. It might be known to most of them that the Institute had been taking a considerable interest in the design of the new bridge, and possibly Mr. Caröe, who represented the committee, would say something on the subject.

Mr. W. D. Caröe was afraid he could not give much information upon the point the President had raised, and he would first propose a hearty vote of thanks to Mr. Statham for giving them what might be termed a "record-breaking" paper. He was reminded that many years ago, before he came to London, he was taken, quite by chance, to hear a very interesting lecture upon the subject of ornament. One of the points of that lecture was as to the ornament upon the piers of modern Blackfriars Bridge, and the author of the lecture was Mr. Statham, who said some pungent things. That was, perhaps, the first time that he (the speaker) began to take an interest in bridges, and he felt therefore he could offer Mr. Statham his hearty thanks for the architectural suggestions which he then made, and which had clung to him ever since. The present paper was opportune in two ways; first, because it was such an admirable illustration of the papers read on the previous Monday, upon "The Value of Simplicity in Architecture." Secondly, because London was going to have a new bridge, or rather two bridges, viz., one at Vauxhall and one at Lambeth. He was glad to hear Mr. Statham describe the present bridge at Vauxhall in such favourable terms. The parapet seemed to be a most admirable illustration of how simple lines, simply treated, could be made into a most artistic whole. If the new bridge was to be built of iron, and they could persuade the County Council to adopt some construction which would be suitable to the re-use of the parapet, they would be going a long way towards getting better iron construction. He drew attention to the practical and possibly architectural value of shelters on the piers. He had seen one of the designs for the new bridge, and he must say that they were greatly indebted to the County Council for the courteous way in which they had met the representations made to them by the Institute upon this point. He heartily agreed with what Mr. Statham had said about the importance of securing stone bridges for London. This matter had been strongly represented to the County Council, but he was sorry to say that steel and stone piers seemed to rule, for cheapness sake. It cost, he believed, between 100,000/., and 200,000/., less to make a bridge of steel with granite piers, than one constructed altogether of granite, while Portland stone was not in favour in connexion

with granite, though he could not see why. That being the case, they should consider the best way of constructing a steel bridge with stone piers in some manner which would be architectural. There was no doubt it was possible to get a fairly good effect in that way, if the steel was simply treated in a straightforward manner as steel. He greatly admired an iron suspension-bridge when well constructed, and as an instance he would refer to that at Budapest, designed by an Englishman, who also designed a very poor bridge at Shoreham. One element of difficulty lay in the changing water-level. In Paris, except at flood-time, the Seine remained at the same level, and, therefore, the proportions of the bridges were always the same. In London, however, there was a difference of from 10 ft. to 15 ft. between high and low water, so that sometimes a bridge had no legs or feet at all, the arches springing right out of the water, while at another time it had long legs, and the proportions were entirely changed. That was a point which Rennie took into consideration. He believed it would be found that the proportions of Waterloo Bridge were best when the tide was about two-thirds down, that being about the period when it was longest seen. At very high tide, the lower parts of the piers and the orders were entirely covered, and then the proportions were not good, but perfection could not be attained at all times. Now, that was a point not taken into consideration in the more modern bridges, but whether the bridge was of iron or stone it was a most important matter. Another point of interest was the buttressing of a bridge upon the reverse side to the current. Old Stirling Bridge was one of the most charming structures of the kind. It was rather narrow for its length, consisting as it did of three arches, which showed that the builders of those days were able to construct a large elliptical arch. In such a case, buttresses on both sides would be allowable, because they supported the narrow bridge. Stirling Bridge, too, was remarkable for solid masonry construction, the architect adopting the admirable principle of not laying a stone except upon a level bed. He joined Mr. Statham in his admiration of Kew Bridge, and the Institute had already made representations to the local authorities to the effect that Kew Bridge, as well as Richmond Bridge, should be preserved. To mention the Tower Bridge to him was like holding up a red rag to a bull. In fact, he considered it the most poisonous piece of architecture they had ever had, because everybody seemed to think it so beautiful, and the Press also represented it as such. One could imagine the fine old Norman keep, and the magnificent archway of the water-gate of the Tower, smiling derision at such an example of nineteenth century progress.

Mr. Halsey Ricardo was very much struck with the distressing story in Mr. Statham's paper, how in the matter of beauty they seemed to be going from bad to worse in the design of bridges. Perhaps much was due to the conditions of the present day in regard to these. A bridge now-a-days had to be constructed to meet the haste of impatient people, who would not go up-hill to climb over it, and who refused to have small arches, because they impeded the traffic on the river. If, then, there must be such immense spans and levels, such sizes did away with one of the accustomed notions of beauty. Waterloo Bridge, no doubt, was a fine affair in itself, but it was simply crushing to Somerset House and other buildings in its vicinity.

Mr. Geo. H. Fellowes Prynne said the subject of Mr. Statham's excellent paper was one of great public interest, and he was glad that the new Tower Bridge had rightly received severe criticism. But in this bridge he felt there was something just good enough to make one wish it was better, and something just bad enough to make one wish it was not there at all. To see the Tower Bridge at its best it should be visited in a fog; the general massing was then seen without being spoilt by the poor and weak detail. A great opportunity had no doubt been lost of making a bridge worthy of the entrance to such a city as London. It was a shame, in fact, that the genius, which he hoped was still existent amongst English architects, had not been more generously consulted in connexion with this bridge. He had much pleasure in seconding the vote of thanks.

Mr. B. F. Fletcher believed that Mr. Statham meant to convey not exactly that iron was bad, but that, in many respects, it was not quite so monumental as stone. That, of course, brought in the great question of modern economics. Those who had seen some of the bridges in America,

such as the great Brooklyn Bridge, and the cantilever and suspension bridges at Niagara, must admit that although, as Mr. Ricardo had said, they felt necessarily the loss of scale, yet there was a certain amount of grandeur from this treatment of a new material, which, though not quite appreciated now, would be so in a good many years' time. The great span of Brooklyn Bridge was really a grand and impressive sight. The mistake, in the case of the Tower Bridge, seemed to have been caused by the divorce of architecture and engineering.

Mr. S. B. Beale thought that a perusal of Mr. Statham's paper would give an intelligent engineer sufficient knowledge to enable him to avoid the terrible things they saw perpetrated at the present day. On the other hand, an architect would have to devote a very considerable amount of time to learning even the rudiments which would enable him to attempt anything in the way of engineering, and particularly in the matter of iron bridges. He supposed there was little doubt that the conformation of the river's bed had altered since the span of the arches had been widened, and it had been stated, with authority, that the lack of water in the upper reaches of the Thames was largely due to the alterations in the spans of the arches of recent bridges. As architects, they were largely interested in bridges, and he was therefore pleased that Mr. Statham had opened up the question, and he believed that engineers would largely benefit by the remarks that had been put before them. The paper was an important one, because it dealt with structures which undoubtedly, more than any other, made or marred the beauty of a great city.

The President considered that a debt of gratitude was owed to Mr. Statham for having given up so much of his scanty leisure to preparing such an admirable paper. He should like to emphasise what Mr. Caroe had said as to the very courteous manner in which the Art Committee of the Institute had been received by the County Council. Indeed, they appeared to be glad to find that architects took sufficient interest in the bridges of London to send a deputation. Unfortunately, when they came to the question of having a bridge of stone, instead of one of stone and steel, the question of cost seemed to be prohibitive. He suggested that Portland stone might be substituted for granite, but was informed that the difference in cost was quite trifling. It had occurred to him since that there was no reason why, if the piers and arches were made of granite, the rest of the bridge should not be constructed of red brick. The piers of Charing Cross Railway Bridge were built of red brick, and both stood and looked well. That would meet Mr. Statham's point that engineers' iron bridges, on good solid brick or stone foundations, did not look bad. After all, the whole trouble with the engineers was that they would try to be architectural, while, if they would only stick to their simply constructional iron or brick and stone, nobody could say a word against them. The chief feeling the paper had left upon his mind was that all the beautiful bridges had gone or were going. The view they had seen that evening, of old Hammersmith Bridge, seemed to show that it was the finest suspension bridge they had had near London, while those existing at the present moment were all more or less dreadful. As to the Tower Bridge, he did not think it was really so bad as it was made out to be. If the windows in the towers were filled up solid with stone, and the crowded turrets, gables and finials, were removed, it would not be a bad bridge. He had seen it under a great many conditions, and if the detail could be obliterated, the outline of the bridge was not unpleasing. It would be well, therefore, if the Art Committee of the Institute could approach the Corporation, and suggest that a few thousand pounds should be spent in taking down these things and filling up the windows.

The vote of thanks was then put, and heartily received.

Mr. Statham, in replying, said that a suspension-bridge, owing to its lines, could not be other than beautiful, if let alone. Mr. Caroe had referred to Stirling Bridge, and in such a case buttresses on both sides might be required. At the same time, the up-stream buttress should be of a different shape to the down-stream one; the conditions were different. A reference had been made to Waterloo Bridge as destroying the scale of Somerset House, but if they got bridges on a grand scale, they must endeavour to make the surrounding buildings correspond. As to iron, he was not a fanatic against it; in fact, he had a great admiration for the Forth Bridge. He did not want, however, to see iron treated "orna-

mentally," or put in where stone would do quite as well. With regard to expense, it should be borne in mind that a granite bridge would probably last three times as long as an iron one. He had asked Sir Benjamin Baker how long the Forth Bridge would last, and the reply was that with proper care, it might last five centuries. He would ask, how long had the Pantheon lasted without much care? As to filling up the openings in the Tower Bridge, no doubt that would improve it in outward appearance, but they would still have the poisonous knowledge of the shabby construction remaining.

The proceedings then terminated.

ARCHITECTURAL ASSOCIATION, DISCUSSION SECTION.—A combined meeting of this Section of the Association and the A.A. Camera Club was held at 56, Great Marlborough-street on the 20th inst. The subject of the discussion was the relative merits of the Sketch-book and Camera as Aids to Architectural Study, and proceedings were opened by the reading of brief papers by Mr. Francis R. Taylor and Mr. Matt. Garbutt, A.R.I.B.A. The papers were illustrated by lantern slides by members of the Camera Club sketches by Mr. Garbutt, and photographs by Messrs. Wonnacott, Allport, Vernon, Lewis, Henderson, Sheridan, and the Special Visitors Messrs. Fleetwood and Hooper, joined in the discussion.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday, at the County Hall, Spring Gardens, Sir John Hutton, Chairman, presiding.

The Water Question.—The debate on the report of the Water Committee was resumed. The recommendations of the Committee were:

"1. That the Council is of opinion that the scheme for a system of storage reservoirs, presented to the Royal Commission on Water Supply by the water companies, coupled with the proposal to abstract large additional quantities of water from the rivers, is not the proper method of meeting the future wants of London. 2. That any further capital expenditure on works in the Thames at Lee valleys for the supply of London should be regarded as of a temporary character, and should be restricted to such improvements as may be for the time indispensable. 3. That the true solution of the problem is the obtaining of the necessary additional supplies from a purer source; and that accordingly the Water Committee be instructed to proceed with the preparation of a scheme to be presented for the consideration of the Council as soon as possible, with a view to an application to Parliament for the necessary powers."

Mr. Beachcroft moved the following amendment on paragraph 1:—

"That the following words be added, 'but that in view of the facts disclosed by the report of the Water Committee, which lead to the conclusion that the acquisition by the Council of the water companies' undertakings may involve the Council in an outlay of over fifty millions, it is essential, before the Council is asked to commit itself further, that the financial aspect of the whole question should be considered; and accordingly that it be an instruction to the Finance Committee to report on the estimated effect of the acquisition of the undertakings of the water companies on the county rate, having regard to the recent report of the chief engineer and to the terms of the scheme for the creation of new stock approved by the Council on the recommendation of the Finance Committee in July last.'"

He said that it was desirable there should be some kind of authority over the water supply. Sir W. Harcourt offered three alternatives. One was regulation, the other independent supply, and the third was purchase. Mr. Bassett Hopkins said that the majority of the Council had practically resolved that the only way in which the object could be attained was by the acquisition of the water companies. He proposed to mould into one the last two alternatives of Sir William Harcourt. Having regard to the report of the Water Commission the Moderate party did not yet consider that the Thames was insufficient to supply the water for London. As to his statement in his amendment that 50,000,000l. would be required, he took that 30,000,000l. at least would have to be found for the acquisition of the water companies' 18,000,000l. would be required for a supplementary supply, and 2,000,000l. would be required for temporary works which the committee admitted would be required.

Sir George Harris seconded the amendment. The vice-Chairman, Mr. Charles Harris, said that in the large provincial towns they found millions of money invested in the water-supply returning a good dividend to the reduction of the

tes, and if that could be done in other large towns, why could it not be done in London? That was good enough for forty-three municipalities outside London should be good enough for London.

Sir John Lubbock said he was heartily in sympathy with the report of the Committee, as they were all agreed that before long they must look for some additional water supply. The Royal Commission had only reported on one mode of supply, and therefore its opinion was not of the value it would otherwise have been. He thought they must look away from the Thames for a future supply, and whether a supply obtained elsewhere could be cheaper or not it would undoubtedly be cheaper, and that was the great point. The areas on which they could obtain a supply were getting fewer, and they must take care to secure water rights where possible as soon as they could, although he was in favour of the report, he did not see anything antagonistic in the amendment to it. The question of a remunerative instrument depended on what they paid for it, and he confessed he thought they would be making a mistake if they attempted to buy up the water companies at present.

Lord Farrer opposed the amendment, as he thought they should pass the resolution to show that they did not consider the report of the Royal Commission conclusive.

After further discussion, the amendment, on a show of hands, was lost, and on a division the voting was: for the amendment, 19; against, 62. The recommendations of the Committee were then agreed to.

The Council adjourned shortly before 7 o'clock.

COMPETITIONS.

PUBLIC OFFICES, SUTTON, SURREY.—The competition for public offices, fire-station, technical Institute, and swimming-baths, at Sutton, Surrey, has just been decided as follows:—First premiated design, Messrs. Curry & Atcock, Sutton; second, Mr. H. T. Hare, Epsom-buildings, Adelphi, W.C.

ENGINEERING SOCIETIES.

CIVIL AND MECHANICAL ENGINEERS' SOCIETY.—At the last meeting of this society, Mr. E. H. Brewster, A.M.I.C.E., read a paper on "Water Waste-Preventer Cisterns." He first drew the attention of the meeting to the necessity for these, and illustrated this by giving particulars of the quantity of water that would run to waste through small holes, e.g., a hole only one-sixteenth of an inch in diameter in a pipe having a pressure of not more than 45 lbs. per square inch would result in a loss of 43 gallons in a day. Attention was then drawn to the waste-preventer cisterns of J. Ashley and T. Binns, patented in 1792 and 1793, or more than a hundred years ago. Waste-preventer taps were incidentally touched upon. The modern types of water waste-preventer cisterns were divided into four classes. 1. Tip-up apparatus; 2. Cisterns with inlet and outlet valves only; 3. Cisterns divided into compartments and having more than two valves; 4. Cisterns worked in conjunction with siphons. The latter class was stated to be the one most commonly used at the present time. The "Tower" cistern was particularly alluded to as being one of the simplest and the foremost of the valveless type now very general. The "Paisley" was also described, as were many others.

THE INSTITUTION OF CIVIL ENGINEERS.—At the ordinary meeting of this Institution, on the 9th inst., Sir Douglas Fox, Vice-President, in the chair, a paper was read descriptive of "Plant for the Extraction of Gold by the Cyanide Process," by Messrs. Charles Butters and Edgar Mart, A.M.I.E.S.C.E.

SURVEYORSHIPS.

KETTERING.—Out of ninety-seven applicants for the office of Chief Assistant Engineer and Surveyor to the Urban District Council of Kettering, Mr. Ernest H. Essex, of Nottingham, has been selected.

MEMORIAL-TABLET, ST. MARGARET'S CHURCH, URBINE, LANARKSHIRE.—On the 17th inst. the ceremony of unveiling a memorial-tablet to the memory of the late Rev. James Canon M'Intosh, took place in St. Margaret's Church, Urbine. The tablet was designed by Messrs. Pugin & Pugin, London.

Correspondence.

To the Editor of THE BUILDER.

DURHAM CATHEDRAL.

SIR,—The discovery of certain fragments of the original eastern termination of the Norman Cathedral of Durham has already been noticed in your columns. The *Times* of February 16 contains a letter from Mr. C. Hodgson Fowler, F.S.A., the cathedral architect, describing in detail what has been found. He considers it difficult to account for the foundations of the aisle apses, and suggests that they are part of the foundations of Aldhun's church, probably of the apsidal chapels opening out of the transepts.

I venture to think that such a theory will be found to be quite untenable. It involves the supposition that Carilef's designer set out the plan of his entirely new building in 1093 in such a manner that his south choir aisle was exactly central with one of the transeptal apses of Aldhun's church, while his north choir aisle only deviated 6 in. from the centre of the other transeptal apse; or, in other words, that he must have allowed the retention of two inconsiderable fragments of the earlier church to control the elementary width he fixed for his new building.

The foundations which have been discovered clearly indicate that the choir aisles terminated in apses internally, and were finished square externally. The thickness of the foundation wall in the centre of the northern apse (east and west) is nearly 13 ft. It is quite clear, however, that the foundation of the aisle wall was made sufficiently wide to receive not only the wall itself, but the buttresses and their plinths on the outside, and the vaulting-shafts and their bases on the inside. A part of this foundation is still to be seen on the outside of the north aisle, next the Nine Altars, and is shown on Mr. Hodges' plan in your Cathedral series. The foundation of the aisle-wall must, therefore, be between 11 and 12 ft. in thickness, and the difference between this and the thickness in the centre of the apse is not great for foundation work.

The eastern termination of Carilef's church, as revealed by these excavations, consisted, then, of a great apse to the choir itself, and small apses to the aisles, the latter finishing square externally. Such a plan was not uncommon in the larger Norman churches of the half-century following the Conquest. It was adopted at St. Albans (see Buckler's plan) and at Peterborough. The latter is an interesting parallel to Durham, and is very similar in plan, though it shows considerable advance in the method of setting out the apse. In Normandy the same plan is found in the churches of Lessay, St. Nicholas, Caen, St. Georges-de-Boscherville, and St. Gabriel, all illustrated in Ruprich-Roberts' "L'Architecture Normande." Romney, quoted by Mr. Robson, has the same form of termination to the aisles only.

JOHN BILSON.

Hull, February 19, 1895.

"PROFESSIONAL ADVERTISING."

SIR,—My attention has been called to a letter in your last issue signed "A.R.I.B.A." The explanation of the facts commented on is very simple. Not only was the notice-board in question not put up by me or at my instigation, but absolutely without my knowledge or consent, and I did not know of its existence until your correspondent's letter appeared.

JOHN SLATER.

** Had Mr. Slater's name been mentioned, we should have known that there could be no explanation but that given by him; and our correspondent showed great want of knowledge of the world in imagining that any man in Mr. Slater's social (to say nothing of professional) position would have put up his own name with "Esq., B.A." after it, which it appears was the "style" of the notice-board referred to. But there are other such boards around in which we suspect the advertising of the architect's name is not done without his concurrence.—ED.

EFFECTS OF EARTHQUAKE ON BUILDINGS IN JAPAN.

SIR,—Among the Notes in your issue of August 25 last, is one quoting from a letter sent by Messrs. Ende & Boeckmann, architects, of Berlin, to the *Deutsche Bauzeitung*.

The statements made in that letter are entirely misleading, and I am writing to your German contemporary to contradict them; may I, at the same time, ask you to be kind enough to give publicity in your esteemed journal to a similar explanation?

Messrs. Ende & Boeckmann, referring to the severe shock of earthquake experienced in Tokyo

on June 20 of this year, state, presumably upon an incorrect report furnished to them, that, whereas all other brick buildings suffered severe damage, the blocks erected from their designs withstood the movement without showing a crack. In the same context they assert that thirty-two buildings collapsed, eighty-one were razed to the ground, and 4,551 were damaged, adding that though the majority of these were of native construction, the latter withstood the shock far better than the average European structure. These statements all tend to convey the impression that the two buildings erected by Messrs. Ende & Boeckmann were the only brick and stone erections uninjured by the earthquake, and that most, if not all, of the others were seriously damaged. The architects named also take credit to themselves for the originality of certain constructive precautions which they claim brought about such satisfactory results.

Before controverting these implications let me premise by stating that the modern art and science of building was introduced into this country some thirty years ago, from which time foreign architects and engineers of several nationalities and Japanese experts, as education and experience prepared them, have erected numerous solid buildings in the capital, and other large towns, for governmental, educational, commercial, and manufacturing purposes. In these works earthquake considerations have always to some extent exercised a precautionary effect. Buildings have never been made of any great height, and heavy cornices and overhanging constructions, so common in the West, have been avoided. A French architect some seventeen years ago introduced a system of iron network built in brick walls which was applied to several buildings. It was not, however, until a shock of more than usual severity occurred in some of the southern provinces, in October, 1891, that an opportunity was given to local architects to study the effects of a really violent oscillation upon certain modern structures as compared with those in the ancient style. Unfortunately most of the brick buildings existing within the radius of severest commotion were of the provincial and manufacturing class, possessing serious defects from the point of view of merely ordinary secure construction. Osaka, a large town sufficiently near the centre of disturbance to be most seriously shaken, contained, however, certain brick and stone buildings solidly erected under competent supervision, which gave a very good record, contrasting favourably with the effects upon brick buildings of a speculative class in the same locality.

Precautions in all new buildings erected in Tokyo were henceforth redoubled, particular attention being paid to the quality and adhesion of the mortar; the thickness, bond, and continuity of the walls; the suppression of heavy gables, chimney-stacks, and unflanked masonry; and other points on which the Japanese architects (who by this time chiefly controlled the building operations of the country) were mutually agreed. The result has been that in the severe earthquake of Tokyo on June 20 of this year, which is the subject of Messrs. Ende & Boeckmann's letter, all of the more recently-erected brick buildings, and a considerable number of the better class of solid structures erected during the last twenty years, were entirely uninjured. Among numerous structures of equal importance to those of Messrs. Ende & Boeckmann which exhibited no sign whatever of injury from the shock, may be mentioned: the Central Bank of Japan, the 18th National Bank and Mitsu Bishi Offices, the Meiji Insurance Offices, the Tokyo City Hall and Municipal Offices, the General Post Offices, the Agricultural and Commercial Department, the Department of Communications, the New Admiralty Offices, and the principal blocks of the Imperial University. These are all large and prominent buildings, some of them three stories in height. Many other important buildings might be mentioned in which the chimney-stacks alone were damaged, and which would not have suffered had heating apparatuses been employed (as in the Departmental Offices), or had iron stacks (as now everywhere adopted) been introduced. The official residences, most of the foreign Legations, and certain well-built private houses, come under this head. A few brick buildings were so fissured as to require their being afterwards condemned, but none suffered collapse at the time of the earthquake, as erroneously stated; and for the most part a few repairs to the chimneys, parapets, gables, and upper arches have rendered damaged buildings safe and habitable. A large mercantile district in Tokyo, known as the Ginza, has for twenty years been covered with continuous blocks of brick buildings, consisting of some hundreds of houses and shops, and these, though of the most simple and unpretentious character, escaped with only slight injury in places.

Messrs. Ende & Boeckmann's visits to Japan in 1886 and 1887 resulted in the preparation of designs for certain Governmental offices for Tokyo, and the commencement of two blocks—the New Law Courts and the Ministry of Justice—under their general direction from Berlin, with the aid of five assistant German architects and several Japanese architects on the spot. These two buildings, together with a temporary wooden structure for the Imperial Diet, were unfortunately consumed by fire immediately after completion, are the only buildings carried out from Messrs. Ende & Boeckmann's designs, and neither

they nor their assistant complicitors carried them to completion. They will still take another year to finish, and have for the past year and a half been entirely under the direction of Japanese architects. Projects and general drawings were prepared by the Berlin firm of architects for a permanent Imperial Diet (illustrated in your Journal of October 23), for the new Admiralty and the Central Police Office, but these have been made no further use of. The new Admiralty Offices are just completed from totally different plans and designs, and the Permanent Imperial Diet and Central Police Office are abandoned.

It would, indeed, have been strange and unfortunate if the two blocks partially carried out by Messrs. Ende & Boeckmann, at such cost and with such unexampled local assistance, had fared worse in the violent earthquake of June 20 than other contemporary erections of like character; and I and my colleagues are desirous of giving all credit that is due in endorsing the statement that these two buildings suffered to no appreciable extent during the shock. But that, in this respect, they were isolated exceptions to other buildings of their class, or even to buildings of a less costly character. I respectfully beg, most distinctly, to assert that Messrs. Ende & Boeckmann have been most seriously misinformed in the matter.

TATSUZO SONE, Architect.

Tokyo, Japan. Dec. 18, 1894.

CANTERBURY SURVEYORSHIP.

SIR,—In your last issue there appeared an advertisement in reference to the above appointment, and, among other particulars, it is stated that the salary of 350*l.* per annum is inclusive of office rent and clerks.

This appears to be a most unreasonable arrangement, for it is impossible for a stranger to know at what amount these expenses should be assessed. Surely it would be far more equitable for the Corporation to follow the usual course and pay these expenses direct, and fix the salary of the Surveyor at a nett amount.

Another point to which I should like to draw attention is the extraordinary condition that applications must be accompanied by twenty-five printed copies of testimonials. This is wholly unjustifiable: why should applicants be taxed to the extent of, say, at least a guinea each for the doubtful privilege of competing for this appointment? It would be bad enough if the selected candidates only were asked to send in these printed testimonials, but even then it would seem more just for a wealthy Corporation to incur the expense instead of throwing the cost upon the competitors, especially as it is for the convenience of the members of the Council that these printed copies of testimonials are required. In the course of a year it would be a serious item to those who compete in many of the appointments advertised if such conditions were generally imposed.

The idea of the assistants being paid by the surveyor out of his salary is a very bad precedent, and would seem to put a premium on "sweating." Even as it is, the younger members of the profession are sufficiently ill-paid, especially considering the proportionate work done by them, as I can vouch, from personal experience, that in many cases the assistants do all the real work, while the chief gets the whole of the credit and the lion's share of the pay. I therefore beg to enter my strongest protest against such a retrograde innovation. Doubtless a large number of really eligible surveyors will be deterred from competing by these two conditions.

"AN ASSISTANT BOROUGH SURVEYOR."

OBITUARY.

MR. T. F. BRIDGEN.—We regret to have to record the death of Mr. Bridgen, of Manchester, late of the firm of Pennington & Bridgen. His death occurred on the 15th inst., at the age of sixty-two. He was a pupil of Cottingham, and was in practice in Manchester and London for thirty-five years. His firm were architects for a great number of hospitals, including the remodelling of Manchester Royal Infirmary, Royal Eye Hospital, Children's Hospital, Pendlebury, and many others in Manchester. The large Convalescent Fever Hospital at Winchmore Hill, for the Asylums Board, and the North-Western Hospital at Hampstead, for the same Board, were also carried out by his firm, which since early last year he has ceased to be a member of, the practice being since carried on under the style of Pennington & Son.

GENERAL BUILDING NEWS.

THE ROYAL UNITED SERVICE INSTITUTION, WHITEHALL.—The new building, which adjoins the Banqueting Hall, Whitehall, and which, in conjunction with that historic edifice, will be the future home of the Royal United Service Institution, was opened on the 20th inst. by the Prince of Wales. The architects were Messrs. Aston Webb and Ingress Bell. A description of the building was given in our issue of the 2nd inst., page 77, and illustrations have appeared under date May 13 and September 16, 1893.

WESLEYAN CHAPEL, SWINTON, YORKSHIRE.—The memorial stones of a new Wesleyan Chapel were laid at Swinton, near Malton, on the 7th inst. Mr. Edward Taylor, of Stonegate, York, is the architect, and the contract for the work has been let in two divisions—builders and plasterers' work to Mr. Henry Oldfield, of Malton; joiners, slaters, plumbers, glaziers, smiths, and painters' work, to Mr. George Mansfield, York. The building will consist of the chapel proper, with accommodation for 200 sittings, and east transept for organ and choir. On the west side will be a school-room separated from the chapel by shutters, and giving accommodation for 100 children. On the north end of the building will be three vestries, all communicating with the chapel and with each other.

EXTENSION OF ROYAL INFIRMARY, ABERDEEN.—Offers have been accepted from local tradesmen for the erection of a new medical block at the Aberdeen Royal Infirmary. The building will be a three-story one, containing six wards for general medical cases, and two small wards for erysipelas cases. Accommodation will be provided for ninety-four beds in all, the beds in the erysipelas wards numbering eight. The total of the accepted offers is 12,365*l.*; and adding the cost of introducing electric light, of painting, architect's fees, and furnishings, the entire expenditure will be 17,000*l.* This block completes the Jubilee extension scheme. Messrs. Smith & Kelly, Aberdeen, are the architects.

RESTORATION OF TOWER, ST. MARY'S CHURCH, BRECON.—The tower of this church will shortly be re-opened, after having undergone restoration under the superintendence of Mr. F. R. Kempton, of Birchfield, Herefordshire. Care has been taken to preserve the old work, and where it was found absolutely necessary to insert new work, precaution was taken to ensure that it corresponded to the old work. The bells have been taken down, repaired, and re-hung, including new bell-framing by Messrs. Taylor & Son, of Loughborough. Messrs. Collins & Godfrey, of Tewkesbury, were the contractors.

NORTH BRITISH STATION HOTEL, EDINBURGH.—The designs of Mr. W. Hamilton Beattie of the hotel which the directors of the North British Railway have resolved to erect on the site between the North Bridge and the Waverley Market, show a building which, when completed, will cost a sum of 221,000*l.* The style is a free treatment of Renaissance. The main elevation is to Princes-street. Here the frontage is of nearly 200 ft., rising six stories from the street level to a height of over 100 ft. at the crown of the roof. One of the features of this elevation is the great tower occupying the centre of the facade, and rising to a height of 160 ft. above the street. The other salient features are the angle pavilions which, ending in cupolas at the roof level, flank the tower at each corner of the building. The massiveness of the tower above the roof level is further relieved by ornamental clock faces. The building has a central court 70 ft. square. The principal public rooms of the hotel occupy the west and north fronts on the level of Princes-street. Public restaurants and bars occupy the north-east corner. The North Bridge front at the ground level is to be chiefly taken up with shops, and the south front is to be occupied by the railway offices. The uppermost stories of the entire block will form part of the hotel bed-room accommodation. The main entrance is under the central tower in Princes-street. The entrance hall, 52 ft. by 26 ft. by 22 ft. high, gives access on the west to the grand staircase hall, which is 46 ft. by 30 ft. Both are designed with pillars, arcading, and galleries; and the double staircase itself is of white marble, with open ascending dividing it from the hall, and with stained-glass windows, is one of the features of the interior. As a prolongation of the entrance hall, carried across the central court is a reception-hall, 58 ft. by 20 ft. and 26 ft. high. The principal dining-room occupies the centre of the west front. It is 78 ft. long and 28 ft. wide. Fronting Princes-street, immediately to the west of the entrance-hall, will be a room 39 ft. by 27, designed for public meetings and dinners.

PROPOSED RESTORATION OF PERTH MUNICIPAL BUILDINGS.—The question of the restoration of Perth Municipal Buildings, which were partially destroyed by fire a month ago, has been considered by the Town Council. Their proposal is to retain the site, and it has been resolved to remit to Mr. Heiton Grainger, architect, to draw up designs for the new building.

SANITARY AND ENGINEERING NEWS.

TRURO DRAINAGE.—Mr. Baldwin Latham has reported on four schemes submitted in competition for the sewerage of Truro, entitled "A 1," "Cornubia," "Fide et Spe," and "Sanitas." The present system admits rain and stream water to the sewers, but as arrangements will be made for intercepting the water which now meanders through the streets, so as ultimately to convey it to its natural outlet in the river, Mr. Latham considers that the provision to be made in the sewers would be for rain falling and flowing off the surfaces of the city. "Sanitas" proposes to intercept a certain proportion of the rainfall from the city sewers, but Mr. Latham says the amount proposed to be expended in this way could only deal with a very small portion of the total

rainfall, and it is hardly worth while to disturb the streets to put in new sewers for this purpose. He expresses decided preference for the scheme of "A 1," which combines the distinctive features essential to be carried out in a district like Truro. Mr. Latham places "Fide et Spe" second, "Cornubia" third, and "Sanitas" last. But, although placing "A 1" first, he points out certain faults in that scheme. The sewers proposed to be laid will not effectually pick up and deal with the whole of the sewage of the city, and other sewers would require to be constructed in order to deal with the sewage of many houses abutting on the river. There is not sufficient tidal storage for rain fall, if flooding the district is entirely to be avoided. The sewers are too small to convey the storm water without flooding to the point of outfall of such time as a high tide and heavy rain may simultaneously occur. The sewers in places are not deep enough to drain certain portions of the district. An important point is that the main discharge of effluent water would always take place upon the ebb tide. In view of the liability of impure water being brought to the city. Nearly all the schemes in order to deal with every house in the city will require some modification and addition which will increase their cost.

STAINED GLASS AND DECORATION.

WINDOWS, PARISH CHURCH, BURGESS HILL, SUSSEX.—The parish church of Burgess Hill, Sussex, has just received six more stained glass windows, five being given by Mr. F. Crunden, of Oak Hall, and one by the Rev. J. L. Shallis, the vicar. The work has been entrusted to Messrs. Mayer & Co., of Munich and London.

WINDOWS, ALL SAINTS' CHURCH, PLYMOUTH.—Four large single lights in the apse of this church have been filled with stained glass by Percy Bacon & Bros., of London. The saints depicted were St. Augustine of Hippo, St. Peter, St. Andrew, and St. Thomas of Canterbury. Seven other windows were lately inserted by the same artists in this church.

FOREIGN AND COLONIAL.

FRANCE.—The Chamber of Deputies has put to the disposal of M. Picard, Commissioner-General of the Exhibition of 1900, a credit of 200,000 francs towards the preparations for the Exhibition. Mr. Picard had only asked for half the sum. The following architects, MM. Henard, Sortais, Tronchet, and Varcloire, who all obtained premiums in the competition, have been commissioned to assist M. Bouvard in drawing out the definite plan of the whole. An immense scaffold has been raised against the Arc de l'Etoile for carrying out important repairs to the structure, especially the cornice, which is in a dangerous state. Fortunately the sculptures of Rude and Etex are in good preservation. The "Société des Artistes Lithographes Français" is arranging for an international exhibition of lithography to be opened next May in the Galerie Rapp. The municipal Council is about to found a school of drawing in the XVIIIth arrondissement with the funds supplied by legacy left for that purpose. The arrangement of the "Salle des Antiquités Africaines" at the Louvre is nearly completed, and it will be opened shortly. The Municipal Council of Paris has decided on the erection of a monument in the Montparnasse Cemetery to the artists who died in the Commune while in their employ, in imitation, to some extent, of the existing monument to deceased firemen. M. Dupré (architect), is commissioned to design the monument, which will consist of a stone pyramid surmounted by a figure symbolising "le Travail." The cost will be about 300,000 francs. A new hospital is to be built at Saint-Etienne, at a cost of 2,600,000 francs. The works for a new railway from Albertville to Annecy are to be commenced shortly. The monument to the "Burgesses of Calais" is to be inaugurated on June 3. The group, by M. Rodin, will stand on a flight of steps, decorated with a figure of a child writing on the tablets of History. The Budget Committee of the Chamber of Deputies has voted a new credit of 100,000 francs for continuing the excavations at Delphi. M. Charles Felix Sainet-Père, architect, member of the Société Centrale, has just died at Paris, at the age of ninety. He was first a pupil in the School of Architecture at Dijon, and completed his studies at the École Nationale des Beaux-Arts. Among his principal works are the Hôtel Dieu at Rennes, the Halles at Besançon, the "Asile de bon repos" at Vaugirard, the church of l'Étang Vergy, Nuits St. Georges, and Prouille schools, institutions, and numerous private houses. His son, M. Eugène Saint-Père, is also a member of the Société Centrale.

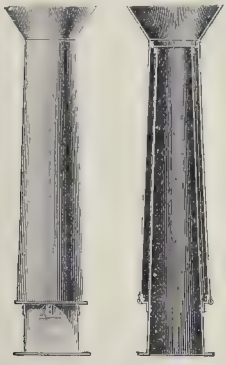
GERMANY.—The municipal sub-committee appointed to consider the projected Suspended Metropolitan Railway (Langen's system) at Berlin, have called in Herr Langen, of Cologne, to assist in the deliberations and furnish a report. A new station on the Metropolitan Railway (a Government line) is to be opened on the Savigny Platz, the cost amounting to 12,700*l.*, will be borne by the landowners in the vicinity. The spread of the electric light in Berlin is strikingly shown by the fact

that there was a decrease in the production of gas during the last quarter of 381,000 cubic metres. —Two statues of the Margraves Albrecht and Waldegar, by the sculptors Boese and Unger respectively, have been recently unveiled on the Mühlendamm bridge. The cost was a 500l. —The commune of Hankow has petitioned against the Police Ordinance which restricts building operations in that suburb to the erection of residential villas. Several other communes are likely to follow suit. —The German Students' Corps Union will erect a monument to Prince Bismarck on the Rudelsburg. The statue, representing the Prince in his younger days, is to be completed this year. —The Munich "Secession" will hold its Third International Art Exhibition in the Galleries in the Prinz-Regenten-strasse, from 1st June to the end of October this year. —A meeting of the executive committee of the Imperial Limes Commission, Herr Zangemeister in the chair, recently took place at Heidelberg, when the programme of this year's operations was drawn up. Last year's work of the Commission, the general report of which has just been published as an appendix to the Year-book of the Archaeological Institute, was chiefly directed to the tracing of the boundary mark, originally discovered by Herr Schott in the Taunus. This mark, it is now determined, occurs in the case of both the Rhenian and Upper German Limes: the form differs locally, the small stones being absent in parts of Bavaria, for instance, though the first is clearly marked. The French itself is occasionally wanting where the ground is hard and stony. Remains of a palisade, extending for a length of 15 kilometres, were discovered on the frontier between Bavaria and Württemberg, near Gunzenhausen. Eighteen main castella were examined, of which eleven were entirely excavated, in addition to five intermediate castella. The first of the latter was found to record the loss by death of several of the members of the Commission, namely, Messrs. von Brunn, von Lohausen, and Hölder.

MISCELLANEOUS.

FROZEN WATER-CLOSETS. —The discomforts, not to say dangers, which attend the freezing of water-pipes are alone hard enough to endure; but when the frost is so severe and stays so long with us as to lead to the stoppage of soil-pipes, we are brought face to face with a new evil which demands very prompt and careful action. We learn that in many houses in the suburbs of London this has occurred, and that in many cases the occupiers have been obliged to carry the excreta into the garden or to call themselves of the premises of an obliging and more fortunate neighbour. When the thaw does set in the consequence of this condition of things may be very serious, and those who are unfortunate enough to be in such time the annual report has made a stock of some efficient disinfectant at hand. It would be a proper and useful preliminary precaution to place a quantity of disinfecting liquid, such as carbolic acid, in the pan of the frozen closet. The public health authorities might, we suggest, help people in this matter, so that pestilence and disease may not be counted amongst the contingencies which prolonged frost brings in its train. —*The Lancet.*

THE "DUPLEX" SMOKE CURE. —This is, at all events, an exceedingly simple chimney-top. The theory of it is that the basin-shaped head, the sides of which incline outwards at an angle of some 36 deg, with the vertical, will throw off any current of wind which may strike its inner surface at an angle not exceeding 36 deg, with the horizontal. It has a



"DUPLEX" CHIMNEY-TOP.

two-fold shaft, the outer portion of which forms a protecting case for the main shaft, and augments the temperature (and consequently the updraught) of the ascending column of smoke. There seems reason in this, but one can seldom predict very safely what a chimney-top will or will not effect till it has been tried. This is a new idea, and seems worth trial.

CREDENCE TABLE, ST. ANDREW'S CHURCH, GUERNSEY. —An addition to the sanctuary of St. Andrew's Church, Guernsey, has just been made in the form of a carved oak credence table. It is the handiwork of Messrs. Harry Hems & Sons, of Exeter. The table is of fifteenth-century character.

LONDON SCHOOL BOARD CONTRACTS. —At the weekly meeting of the London School Board, held on the 14th inst., at the offices, Victoria Embankment, Lord George Hamilton, M.P., Chairman, presiding, the Rev. J. C. Carille submitted a motion asking that the Board's Solicitor should prepare a form of contract for buildings and repairs, providing a schedule of wages as mutually agreed upon by the London Building Trades' Federation and the Master Builders' Association; a clause fixing a penalty, not exceeding 25s., in cases of default; and another clause, fixing a similar penalty, in cases of subletting without the written consent of the architect. In asking the Board to agree to this proposal Mr. Carille said he did not believe it would be possible to ensure the payment of a trade union rate of wages except by the insertion in contracts of a schedule of payments and a clause providing for the imposition of penalties in cases of default. The present system invited a class of contractors who, if they obtained contracts, were sure to scamp the work. Mr. Huggett, on the ground that Mr. Carille's proposal would limit the number of contractors willing to tender for the Board's work, and consequently increase the cost of building, moved that the question be referred back to the Works Committee for further consideration. He regarded the resolution as an attempt to drive the contractors out of the field, so that the Board might become a body of municipal workers. The rules for tendering were already so stringent that the best contractors in London refused to work for the Board, and he did not hesitate to say that these rules had increased the cost of works to the Board by 30 per cent. General Sim seconded the amendment. Mr. Dumphries was opposed to the Board doing its own work; but did not think any harm would be done by introducing into contracts a schedule of wages with a penalty clause attached. Mr. Gautrey pointed out that the resolution only asked the Board to do what had already been done by Government and by the London County Council. Mr. Lynn supported the motion, on the ground that it would lead to a more liberal interpretation of the relations between masters and men. Mr. Blackmore thought a penalty of 25s. would not have the desired effect of preventing breaches of contract, and would only lead to endless litigation, to determine whether or not the terms of a contract had been adhered to. Mr. Benson Clough, Mr. Hamilton, and General Moberly having spoken, a division was taken, when the motion was adopted by 30 against 15 votes.

ART IN DECORATION AND DESIGN. —Mr. C. Voysey, of London, delivered a lecture on the subject at the City Art Gallery, Mosley-street, Manchester, in connexion with the Manchester and Salford Association of Master Plasterers and Painters, upon art in decoration and design. He urged that the decorator must be free from the bondage of imitation, and that to secure the best results the decorator and designer must express living emotions. With hearty thought and feeling placed in the forefront of their work, art would be a living power. It was impossible to say how far the decorator and designer could lead the public in that direction. Too often the decorator became a kind of head foreman, and was expected to carry out the desires of those who had no experience in the matter whatever. Under modern conditions the decorator's life was a very hard recover from Joseph Kaplan, fried fish merchant, Canal-walk and St. Mary-street, the sum of 22l. 2s., made up as follows: —To receiving (in September) instructions, taking measurements and memoranda, preparing plans, elevations, and specifications for rebuilding, and submitting same to the defendant, 20l.; to preparing set of tracing and plans, and forwarding same with application to the Urban Sanitary Authority, 2l. 2s.

THE MEDIEVAL MANOR HOUSE. —Mr. F. W. Bedford delivered a lecture before the members of the Thoresby Society, in their room at the Albert Hall, Leeds, on the 12th inst., on "The Medieval Manor House: Its Architectural History." He remarked that very few manor houses were built during the twelfth century. The Normans built themselves "towers" in different parts of the country, but the land had not been sufficiently subdivided to call the manors into existence. From what examples we had, however, we found that they were generally built on a universal plan of a large hall with a chamber or chambers adjoining,

and this formed the basis on which all manor houses were built up to the end of the fifteenth century. The number of chambers was increased, and other alterations in their disposition took place, but still the large central hall formed the nucleus of the plan. In most examples the hall was on the ground-floor level, and was used by the owner and his followers for both dining and sleeping. Nearly all the examples of the domestic architecture of the thirteenth century were built during the reigns of Henry III. and Edward I. A great many manor houses were built at this time, but they still kept the same general arrangements in plan as in the preceding century. In the fourteenth century a great development took place in domestic architecture. To this period belong the finest domestic and collegiate buildings we have, as the colleges of Oxford, Cambridge, and Winchester; Gainsborough Manor House, Wingfield, and Haddon Hall. The large hall still continued to be the dominant feature in the plan, but it was less used by the owner and his guests. In fifteenth-century manor houses the first thing that struck us was that the hall continued just as before, excepting that in many cases its size had been reduced in proportion to the increase in the number of other rooms —withdrawing-rooms, dining-rooms, and bedrooms. Since the end of the fifteenth century we have made little alteration in the plans of our country houses. During the Renaissance periods —the sixteenth, seventeenth, and eighteenth centuries —they became more formal in plan, but did not differ materially. Great improvements, of course, have been made since in the practical fittings, sanitary arrangements, heating, and so forth; but a fifteenth-century house was often quite as convenient, as comfortable, and pleasant to live in as a modern house, and generally far more dignified and beautiful.

A NEW CASEMENT WINDOW. —A casement window to open both inwards and outwards has been devised by Messrs. James & Co., of Kentish Town. Its normal use is to open outwards, but the piece forming the inner sill and inner rebate is hinged and secured by a spagoclet bolt fastening at top and bottom, and when required can open inwards, and the window with it. The weak point, of course, is the sill, which is necessarily level, with a ridge or partition running along the centre dividing it into two troughs, to oppose the entry of rain; the inner sill is kept high for the same reason. There is, of course, a channel for the escape of water from the sill. It would be all right in a steady rain, but we rather question its being impervious to a continued driving rain. It is however an ingenious sash, and in situations not too much exposed to wind and rain would no doubt be a great convenience.

THE SANITARY INSTITUTE. —At an examination for Inspectors of Nuisances, held at Bristol on February 15 and 16, the following ten candidates were certified, as regards their sanitary knowledge, competent to discharge the duties of Inspectors of Nuisances: —W. H. Chowins, Bideford; J. Craig, Dowlais; F. Dolamore, Bournemouth; H. Evans, Penarth, Cardiff; S. Flood, Crediton; W. K. Hill, Liverpool; J. E. Jarvis, Plymouth; S. L. Lard, London; S. G. E. Lee, Torquay; C. W. Stone, Cardiff.

LEGAL.

SOUTHAMPTON COUNTY COURT: AN ARCHITECT'S CHARGES.

MR. WILLIAM BURROUGH HILL, surveyor, valuer, and estate agent, Above Bar, Southampton, sought recover from Joseph Kaplan, fried fish merchant, Canal-walk and St. Mary-street, the sum of 22l. 2s., made up as follows: —To receiving (in September) instructions, taking measurements and memoranda, preparing plans, elevations, and specifications for rebuilding, and submitting same to the defendant, 20l.; to preparing set of tracing and plans, and forwarding same with application to the Urban Sanitary Authority, 2l. 2s.

Mr. C. Lamport appeared for the plaintiff, and Mr. A. H. Emanuel for the defendant.

It was stated by Mr. Lamport that the amount claimed consisted of the usual architect's charges for work done on the instruction of the defendant. At the time the defendant was under an obligation to carry out the repairs to the building in St. Mary's-street, and lay out a sum of about 800l. on the premises. The plans were prepared and sent to the Urban Sanitary Authority, but they were returned to be amended in some slight particulars. The plaintiff wrote to the defendant reporting the result of the submission of the plans, and asked him to call so that alterations could be carried out; but Mr. Kaplan instead of going near the plaintiff had other repairs of a different character, having purchased the freehold in the meantime. The defendant had declined to pay these usual charges.

Plaintiff gave evidence in support of his case, bearing out the statement made by Mr. Lamport, stating in reply to Mr. Emanuel that he was trying to do his best for the defendant in the plans, and the Council sometimes made concessions. He could very easily alter the plans to meet the requirements of the by-laws, and would have done so free of cost.

Builders' Foremen and Clerks of Works' Institution.—
 Annual Dinner, The King's Hall, Holborn Restaurant.
 6.30 p.m.
Institution of Junior Engineers.—Visit to Messrs.
 Siemens Bros. & Co.'s works, Woolwich. Reception by
 the President, Mr. J. W. Gemens. Train from
 Charing Cross at 9.30 a.m. Book to Charlton.
Queen's College, Cork.—Mr. Arthur Hill on the "History
 of Architecture." XII. 3 p.m.
MONDAY, FEBRUARY 25.
Royal Institute of British Architects.—Mr. Thomas W.
 Aldwinckle on "Fever Hospitals." 8 p.m.
Royal Academy of Arts (Lectures on Sculpture).—Mr. A. S.
 Murray on "The Schools of the late Sixteenth and Early
 Fifteenth Century, a.c." III. 8 p.m.
**Sanitary Institute (Lectures and Demonstrations for
 Sanitary Officers.)**—Dr. John Galton on "Ventilation,
 Warming, and Lighting." 8 p.m.
TUESDAY, FEBRUARY 26.
Society of Arts (Applied Art Section).—Miss M.
 Martin on "Medieval Embroidery." 8 p.m.
Institution of Civil Engineers.—(a) Paper to be further
 discussed:—"Plant for the Extraction of Gold by the
 Cyanide Process." By Mr. Charles Butters and Mr. Edga
 Shaw. (b) Paper by Mr. C. Le Mar, Robert Robertson
 on "Electrical Haulage at Earnock Colliery." By Mr.
 Robert Hay on "Electricity Applied to River Gold
 Dredging." 8 p.m.
**Sanitary Institute (Lectures and Demonstrations for
 Sanitary Officers).**—Mr. H. Manley, M.A., on "Sanitary
 Law: English, Scotch, and Irish; General Enactments
 Public Health Act, 1875; Model By-laws, &c." 8 p.m.
WEDNESDAY, FEBRUARY 27.
Northern Architectural Association.—Mr. C. H.
 Howden on "Organs and Organ Chambers." 7.30 p.m.
THURSDAY, FEBRUARY 28.
Institution of Electrical Engineers.—Mr. W. B. Sawyer
 on "Reversible Regenerative Transformers and Short Air-
 Space Dynamos." (Continuation of Discussion.) 8 p.m.
Civil and Mechanical Engineers' Society.—Mr. A. S.
 Ackerman on "Testing the Strength of Materials." 7 p.m.
Society of Antiquaries.—8.30 p.m.
FRIDAY, MARCH 1.
Architectural Association.—(a) Mr. T. Stirling Lee on
 "The Use of Sculptural Decoration at the Present Time."
 (b) Mr. T. W. Pomeroy on "Plaster Work." 7.30 p.m.
Sanitary Institute (Lectures for Sanitary Officers.)—Mr.

LONDON.—For the construction of 12 in. pipe-sewers, Surrey-road and Rye-road, for the City of London, Messrs. J. T. Newnam & Co., Surveyors, Works Department, Victoria, E.C.—

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T. Adams	25 0 0	25 0 0
H. Cox	228 2 0	224 19 0
J. Jackson	224 9 0	224 0 0
K. Robertson & Co.	224 11 0	224 11 0
W. & Co.	219 17 0	214 1 0
W. H. Wheeler	215 10 0	215 10 0
Killingbeck & Co.	185 10 0	231 9 0
J. S. Smith	179 0 0	225 1 0
J. Gough	175 10 0	225 1 0

* Accepted.

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LONDON.—For alterations to No. 11, Church-street, Westminster, for Mr. J. L. Moore, Messrs. Waring & Nicholson, architects, 15, Parliament-street, Westminster, S.W.—

21 Chatham

LONDON.—For alterations and additions to workshops and stables, at Drummond-street, Hampstead-road, for Messrs. Foxall & Co.—

Vincent & Close

MAIDSTONE.—For alterations to premises and fitting up ladies' lavatories and cloak-room, also for alterations to Office of Inspector of Weights and Measures, for the Maidstone Corporation, Mr. T. F. Bunting, Borough Surveyor.—

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[Surveyor's estimate	9 1	23 0 0

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North & Son	640 0 0	Clarence Wharf Co.	595 11 0
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215 William	605 0 0	Bridge, Mon. *	420 1 0
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1,420 0 0

WAKEFIELD.—For proposed houses, shops, stabling, &c., Upper Kirkgate, Wakefield, for Mr. S. N. Woodcock, Wakefield, Mr. Edward Tattersall, architect and surveyor, Thimble-street, Wakefield.—

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For drawing and plan	1,487
For drawing and plan	1,487
For drawing and plan	1,487
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The Builder.

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MARCH 2, 1895.

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South Porch, Malmesbury Abbey.—From an Engraving by Le Keux.	Single-Page Ink-Photo.
Part of Interior, Malmesbury Abbey.—Drawn by Mr. A. Needham Wilson, A.R.I.B.A.	Single-Page Ink-Photo.
Plan, Malmesbury Abbey.—Measured and Drawn by Mr. R. W. Paul.	Double-Page Photo-Litho.
Hanover Chapel, Regent street: R.A. Silver Medal for Perspective Drawing, 1894; by Mr. Geo. J. J. Lacy.	Single-Page Photo-Litho.
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The Close of the Renaissance.



IN the third of his weighty and sumptuous volumes* M. Müntz brings to a close, we presume, his great history of the art of the Renaissance, a monumental work as remarkable for the thoughtfulness of its criticism as for the number and interest of its illustrations. And seeing that "Fin de la Renaissance" includes such names as Michelangelo, Titian, Tintoret, Serlio, Vignola, Palladio, and Cellini, one can hardly think of it as a period of decadence; though there is some falling off from the simplicity and directness of aim in the earlier art, its richness is that of full efflorescence, not of decay.

In estimating the spirit and character of the time, and its effect upon art, the author considers first the national sentiment of the sixteenth century in Italy, and suggests that we must regard this as specially marked by the substitution of intellectual *finesse* for the older qualities of courage and daring. It has been pretended, he says, quoting from a work of the late J. Addington Symonds ("Renaissance in Italy"), that the Italy of the Renaissance was dominated by the artistic idea. "C'est une confusion," says M. Müntz; it is only true in a wider sense than Symonds intended; it is not the fine arts, but the art of life as a whole, which was polished and refined in a manner which permeated every occupation of life, sculpture, painting, and architecture among them; it was the triumph of logic and reasoned-out perfection everywhere and in every occupation, whether it were that of a prince organising the government of his estates, or a general superintending a campaign. "Substitute the word *reason* for the word *art*, and we shall be at the truth." The effect of this spirit is seen as much in battle, public and private, as in painting. In war the courage and boldness of a former age had not disappeared, but had been transformed; for impetuosity was sub-

stituted military science: and so in private combat, the Italians of the period under review had entirely revived the study of swordsmanship, which attained in their hands a refinement, a "virtuosity" unknown before.* In fact, the sixteenth century in Italy showed about the nearest approach, in refinement of intellect, to the fifth century B.C. at Athens; there was a reason and a method for everything. The contrast in this respect between the earlier and later Italian Renaissance is strikingly exemplified in a great deal of the architecture of the two periods. The early Renaissance palaces showed rather boldness than refinement, the seeking of effect by great masses of wall and cornice; in the works of Palladio and his compeers we have rather the carefully-studied putting together of Classic detail in subjection to a carefully thought-out scheme, the production of architectural reasoning rather than architectural impulse.

M. Müntz devotes two chapters to the architecture of his period, which he regards as having accomplished the greatest work at the time of any of the arts; in spite of Titian and the tombs of the Medici. "In painting, if we except the schools of Venice and Parma" (rather a large exception), "no essential conquest had been added to the works of the masters of the age of gold. But in architecture, on the contrary, one would hardly comprehend the Renaissance if we pause at Bramante. It required another generation for the principles of antique art to penetrate into the spirit of society, to assert themselves with authority and *éclat*. The closing period of the Renaissance alone was to furnish builders sufficiently energetic to transform in a few decades whole quarters of a city, and architects capable of putting their stamp not only on isolated buildings, but on vast collections of buildings. . . . In a word, while painting and sculpture were lapsing more and more into frivolity, architecture was becoming more and more learned and serious."

What does the author mean by "learned" ("savante")? Apparently he means possessed by more knowledge of the antique forms and more learning and facility in apply-

ing them. It must be remembered, of course, that he is professedly writing about the Renaissance, and that in architecture the Renaissance meant the return to the antique types. But is not this rather a questionable position to take? It might be argued, on the contrary, that it was just here that architecture exhibited less of a genuine Renaissance—re-birth—than the other arts. Sculpture and painting had been extinct, but they arose with a life new in itself, not dependent on antique precedent. Architecture had never been extinct, in the same sense and degree, and what was called its renewed life was in great measure dependent on precedent, though, no doubt, it had its originality in a certain sense. In fact the author frankly states this, observing that one sign of the times was the great multiplication of theoretic treatises, and that the new use of engraving facilitated the task of the imitators; "they had not even occasion to interpret the text, to translate the formulae into practice; it was sufficient to copy the figures." This is surely a very singular ground on which to rest the claim for the superior life of architecture over the other arts at the close of the Renaissance. It may be accepted in France; there is indeed a kind of "Prix de Rome" savour about it; it will hardly be accepted in England. The reverence accorded to Vitruvius is another sign of the times which M. Müntz does not forget; "Five Orders alone were admitted, not one more could be allowed; it is true that out of the combinations of these an infinite variety could be realised." This last remark is true no doubt, both as a general proposition and in regard to the works of the particular period under consideration. The personal quality in architectural design, in spite of the reverence for Vitruvius and the Orders, was very strongly developed at this period; and M. Müntz gives a salient instance of this variety in contrasting Michelangelo with Palladio, and the latter with Alessi:—

"Prenons Michel-Ange et Palladio; peut on imaginer deux maîtres plus dissemblables! L'un cherche avant tout le mouvement, l'autre avant tout l'harmonie, des lignes tranquilles et pures. Opposons maintenant Palladio à Alessi; ici encore quel contraste! le premier préconise l'Ordre colossal, encadrant jusqu'à deux ou trois étages dans une seule ordonnance de colonnes ou de pilastres; le second morcelle à l'infini et place l'effet dans la multiplicité des motifs. Bref, que l'on considère les proportions données aux différents membres de

* "Histoire de l'Art Pendant la Renaissance." Par Eugène Müntz, Membre de l'Institut, Conservateur des Collections de l'École Nationale des Beaux-Arts. III, "Italie: La Fin de la Renaissance." Paris: Hachette et Cie. 1895.

* In this connexion it is noticeable that in Shakespeare's references to fencing terms in "Romeo and Juliet," in the banter of Mercutio, the terms used are all Italian—"The immortal passado, the punto reverso, &c.," showing where Englishmen went for their lessons in this respect.

l'architecture ou la combinaison de ces membres les uns avec les autres, les innovations sont également importantes."

All this is true, and it is a point which has been perhaps rather overlooked by writers on architecture in considering the work of the later Renaissance architects. But it appears to be with M. Müntz rather a side issue after all; and he lays the greater stress on the point of "learning," the knowledge of antique precedent, and that is just what appears to us to have been, comparatively speaking, the deadening influence in Renaissance architecture.

The three prominent names among the architects who, as M. Müntz puts it, "codified" the Vitruvian rules of architecture for their generation, were, of course, Serlio, Vignola and Palladio, and M. Müntz devotes some consideration to the respective characteristics of their work. Serlio he considers had not risen to "the height of this great argument," he was not correct enough; "Prenez le frontispice de son premier (livre 1545): que d'agitation déjà, et comme on sent que Michel-Ange a passé par là!" Vignola's principal occupation was to establish the exact proportional measures of the component parts of an order, a pedantic study when carried as far as he carried it, and over which precious time and talents have been spent which might have been better employed; but which nevertheless has a value when not made too much of, as a training in the study of relative proportion in detail. M. Müntz does not forget to point out that these three reformers of architectural design according to antique models were acquainted only with Roman architecture, a fact sometimes overlooked. It seems extraordinary to us in the present day, that, even with the limited facilities of travel in the sixteenth century, no hint of the existence of the architectural treasures of Athens should have been wafted to these ardent Italian students of the antique. What might have been the effect on Renaissance architecture had Vignola and Palladio studied and measured the Parthenon and the Erechtheion, and what valuable records we might then have had in the shape of drawings of their state at that time! It is melancholy to think what opportunities were cut off by this curious ignorance on the part of the Renaissance architects of the monuments of a country so close to them.

Palladio M. Müntz credits with deeper insight than his two compeers; and moreover his studies took a more practical turn in the direction not only of correcting details, but of designing large groups of city architecture, in squares and wide streets which suggested a vast improvement on Mediaeval habits of city building. Nevertheless, we hold that in the matter of design Palladio was one of the coldest, most formal, and least interesting of the prominent architects of the Renaissance, and it was perhaps to his influence more than that of anyone else that, as the author remarks, "the yoke of the order fell more and more heavily" on architecture, it enveloped everything, and appeared everywhere. An exceptional treatment was sometimes the employment of a very heavy plain rusticated basement, with no suggestion of columnar expression at all, and the superposition of stories with small and gracefully-designed orders over this. M. Müntz cites and illustrates the Palazzo Uguccioni at Florence as an example of this treatment, which certainly promotes contrast, but is hardly to be approved; there is too little relation between the one and the other portion, and the upper portion has somewhat the appearance of a new building erected on the basement of an old one.

Among his remarks on decorative treatment in Renaissance architecture, the author refers to the use of Caryatides, and gives as an illustration the remarkable series of terminal figures on the front of the Leoni Palace at Milan, under the title "Les Caryatides au XVI^e Siècle." But these are not Caryatides at all in the true sense, they are decorative terminal figures. The

essential quality of a Caryatid figure is that it should be an architectural supporting member, which these are not; their heads are bowed forward under the cornice, but at some distance below it; they carry nothing; they are only alto-relief sculpture applied at certain points of the structure.

The critical remarks on the works of the leading architects of the period under review are of considerable interest, but we must confine ourselves here to a word on his judgment of Michelangelo's architectural productions. Everything in connexion with Michelangelo is of interest, on the one hand, and yet his claims to rank as a great architectural designer, on the other hand, are so disputable in many ways. The fancy and ingenuity with which the staircase of the Laurentian Library was designed have fascinated M. Müntz, and no doubt it is a piece of work in which one at once sees the hand of a man who thinks for himself and has his own way of doing things; yet, after all, is it not rather like making three staircases out of one? The library itself is chiefly remarkable for the design of its desks, the room itself is a tame and cold design. But it is with Michelangelo's work at St. Peter's that every one who speaks of him as an architect has mainly to deal. M. Müntz, while claiming for Michelangelo that he concentrated a design which Bramante had, as it were left scattered and loosely put together, admits that he substituted for Bramante's detail mouldings and reliefs "more vigorous, but also more heavy." But for the dome he has apparently unbounded admiration, and has no criticism to make upon it. We hardly think he will find this feeling echoed generally among architectural critics, though unquestionably the dome is the finest part of the structure, and unquestionably also its effect has been much spoiled by additions to the building for which Michelangelo was not responsible. One of the finest points about the design of the dome lies in the broad proportion given to the crowning lantern, in place of the narrow attenuated kind of structure commonly found in such a position; it was very likely this in some measure which aided in cracking the dome, but as a mere matter of design it is the best point in it, and is what more than anything else gives to St. Peter's dome its peculiar and unmistakable character. But we are surprised that M. Müntz has nothing to say in regard to what we have always felt as a defect in the design, the manner in which the dome and drum are divided up from the very base of the drum into a series of sharply-marked vertical strips with no break of any kind; the coupled columns, the cornice breaking round them, then the pilasters of the attic, and the huge ribs up the dome, by which its domical form is cut up and interfered with. There is no continuous and unbroken horizontal line anywhere to stop and break this slicing up of the dome and its substructure. The conclusion with which the author sums up his remarks on St. Peter's, however, everyone will concur in: "Partout, on le voit, éclate le passion pour le colossal, à un degré où nul esprit humain n'a jamais atteint."

There is much more that is of interest in the architectural chapters of M. Müntz's book, which are only a small island in the bulky volume. The Caprarola Villa is an object of his admiration, and is specially illustrated. The hard stern concentrated face of its architect, Vignola, looks out of a frame on the opposite page; various portraits of other architects of the period form marginal illustrations to the text; many of them remarkable and powerful heads, among which the larger portrait of Sansovino, after Tintoret's painting, does not figure very well; there is a "five per cent." look about this eminent architect which seems to put him in a different category from his compeers.

In summing up his review of the architecture of the later Renaissance, the author suggests that we can discover in it two schools, quite distinct; one represented

principally by Michelangelo, which searches especially for movement and effect and is the precursor of *rococo*; the other, inspired by Palladio, concerned especially with the preservation of correctness and balance of style; but both dominated by reason. Architectural design, to either school, was a matter of thought, not of impulse.

THE COMPETITION FOR THE ROTHERHITHE VESTRY HALL AND OFFICES.



ALTHOUGH the designs in this limited competition were sent in last September, the award has only recently been made, and the whole of the six sets of drawings have been on view during this week at the Public Library, Lower Road, Rotherhithe. The arrangement of the competition has several characteristics which are not very usual. The six competitors were invited by the Vestry, and each received the sum of £20 as a premium. The competitors entered with no assurance as to a professional assessor, and as far as can be ascertained the Vestry have been the sole judges of the designs. Though this course may be condemned in most cases, we are not prepared to disagree with the award, and the Vestry have selected a fair design, which is certainly the best amongst a poor lot. The conditions were fairly drawn, and required the provision of the following accommodation:—Vestry Hall for seventy-five members, Committee Room, and a Public Hall; Clerk's offices, Surveyor's offices, Medical Officer's and Sanitary Inspector's offices, with the usual accessory apartments and caretaker's quarters. The cost was limited to 15,000*l*. The invited competitors were Messrs. Murray & Foster, and Messrs. A. B. Thomas, Francis J. Smith, George Elkington, Charles Bell, and Robert Walker. By the award of the Vestry, the first place is allotted to Messrs. Murray & Foster's design, whilst those of Mr. Charles Bell and Mr. Francis J. Smith occupy respectively second and third places. The site calls for no special comment; it is rectangular in shape, of a uniform level, free from restrictions as to light, and bounded on three sides by streets, of which the Lower-road and Neptune-street are the most important.

Messrs. Murray & Foster, whose design has been selected, have submitted a carefully worked-out set of drawings. They have placed the entrance to offices in the centre of the Lower-road frontage, with a passage leading to an octagonal hall; from this a staircase leads to the Vestry Hall and other rooms on the first floor. The Public Hall is placed on the ground floor, with its long axis parallel to Neptune-street. The principal entrance to the hall is placed in centre of the Moodkee-street frontage, with stairs on each side to the gallery. The hall is of good proportions, and the original design shows a corridor on three sides, which is well lighted, and has emergency exits in convenient positions. This, no doubt, is a desirable arrangement, but it unfortunately sacrifices ground space, which is valuable. This appears to have been recognised, as an amended plan, which is attached, shows this space thrown into the hall, and with the emergency exits opening directly into the hall. The abolition of this corridor interferes slightly with the ladies' and gentlemen's cloak-rooms, which are placed at the corner of the Moodkee frontage. The plan of the stage shows a passage behind the platform communicating with retiring-rooms with lavatory accommodation on each side; there are also retiring- or dressing-rooms on the gallery level reached by circular staircases on either side. The Vestry Hall itself occupies the first floor facing towards the Lower-road. The Committee Room or Coroner's Court, with retiring- and cloak-rooms, are adjacent on the same floor. The second floor is

devoted to the caretaker's apartments, reached by a staircase which also serves those who wish to occupy the public gallery to the Vestry Hall. The drawings of the elevations are carefully prepared, and two perspectives are submitted which indicate a brick and stone treatment. The position of the tower appears to be unsatisfactory and out of proportion with the rest of the design, it appears to have been dragged in to meet the vestrymen's well-known love for a tower at any sacrifice. The design would not suffer by its omission. The proportions of the elevations otherwise are well arranged, though the Moodkeestreet elevation degenerates somewhat in this respect.

Mr. Charles Bell, whose design is placed second, differs from the last in several material points. The Public Hall is relegated to the first floor, whilst the Vestry Hall is on the ground floor and faces Moodkeestreet. The approach to the public hall is by stone stairs on each side, by which a balcony is reached in the centre of the Lower-road frontage, designed for uses of public speaking. The offices which occupy the ground floor have entrances from Lower-road and Neptune-street, each leading to a central main corridor. The offices appear to be well planned, so as to give ample space, and in this respect the design may claim superiority over Messrs. Murray & Foster's. The elevations are shown in perspectives in sepia, giving startling chiaroscuro effects. The whole design lacks repose. Examination of the drawings submitted by Mr. A. B. Thomas was attended with a good deal of pleasure, for though the planning is defective in one or two respects, the whole design has been worked out with great care. The elevations show much delicacy of feeling, and are not surpassed by any. Mr. Thomas has placed both his Vestry and Public Hall on the first floor, and has failed in giving good exits. The Committee Room is placed on the ground floor, and is too remote from the Vestry Hall. The accommodation in the public gallery to the Vestry Hall is not all that would be required. The hall is very large, and has a refreshment-room added to it, which would be a great convenience. The tower in this design occupies its proper place at the corner of the two principal elevations, and is a graceful composition.

Mr. Francis J. Smith's design places the offices on the ground floor, the Public Hall and Vestry Hall on the first floor, with a large Committee Room and retiring-room adjacent. The elevations are so poor that no further mention need be made of this design.

We pass by the design submitted by Mr. Robert Walker in despair. The very best plan would not atone for the vulgarity of the elevations.

Mr. Elkington's design is certainly better than the last. The Public Hall and Vestry Hall are placed on the first floor, the ground floor being devoted to the offices. The elevations are quiet and simple.

The award need not be found fault with: the assessors were not troubled with any architectural problem of difficult solution.

NOTES.

IN our obituary column we have given a few particulars as to the life and work of the late Mr. Evan Christian, whose death will be regretted by all who knew him, and who leaves behind him the reputation of an accomplished and conscientious architect and a kind-hearted and courteous gentleman. Mr. Christian was nearly 81 at the time of his death, and therefore cannot in one sense be said to have died prematurely, but one cannot but regret that he should not have lived to see the completion and opening of his most important building, the National Portrait Gallery. In the design of this Mr. Christian had contrived, with a great deal of judgment, to give a special treatment to the main block of building at the back of the National Gallery, while effecting the juncture of the old and new building on the east side in such a manner as to avoid any clashing with the architectural design of the National Gallery itself. The only point we think rather questionable is the appearance of the assemblage of pediments of different sizes on the intermediate portion of the building, as seen from the east. But the main block is a dignified structure suitable to its position, and if the interior planning and lighting has been carried out, as will probably be found to be the case, in a practically satisfactory manner, the building will be a worthy monument of its architect.

A PREPRINT of the forthcoming number of the *Mittheilungen* of the German Institute at Athens (xix., 4) has reached us, containing the official plan of the excavations on the west side of the Acropolis. It is now possible for all students of Athenian topography to see clearly what has been done, and what still remains, and to decide for themselves whether they consider Dr. Dörpfeld has succeeded in finding the ancient fountain of Kalirrhoe and establishing it in front of the old city gate. Whatever may be the final opinion on this point, happily many other points are settled beyond dispute. First and foremost the plan before us clearly indicates the direction of the Panathenaic way. On its left side is the ancient triangular precinct of the temple of Dionysos *in Limnaia*—of the Marshes. Enclosed within it is the substructure of a large altar, three metres square, table-shaped, and in the north-west corner is a well-preserved wine-press, above which in more recent days a second wine-press of smaller dimensions had been erected. In the south corner of the precinct the substructure of a small, early temple has been laid bare; it consists of a square cella with pronaos facing south-east. The precinct walls are of calcareous, polygonal masonry, being in good preservation owing to the fact that the whole structure lay considerably below the level of the early road, and the *hieron* must in early days have fallen into ruin, and got filled in and built over. The later quadrangular Baccheion, identified by an inscription, occupies in part the same site. In the polygonal precinct we have unquestionably the boundary-wall of the ancient Leneaion, and the bearing of this on the description of the ancient *polis* by Thucydides is evident. Immediately opposite the Leneaion, on the other side of the way, is a building, the purpose of which is not yet clear. It may be a private house. Its chief interest lies in the fact that it contains what is probably the earliest Greek mosaic pavement extant. The walls of the building, which are of the same date as the pavement, are polygonal. Further on to the left of the road, going towards the Acropolis, is the precinct of Asklepios, which we drew attention to last year. The excavations so far have been largely supported by private subscriptions and under serious disadvantages; negotiations had to be carried on with individual landowners, and each piece of ground excavated had to be filled in as soon as examined. Now the important discoveries made have induced

the Greek Government to hand over the whole of the western slope of the Acropolis to the Germans for excavation, and Dr. Dörpfeld will proceed at once to the unexplored "Eleusinion."

THE second reading in the House of Commons of the Lambeth Water Company (Transfer) Bill last week is an important matter. It was the first of the Bills promoted by the London County Council to transfer the water-supply to them. By the second reading of the Bill two things are clear. First, that the House of Commons approves of the principle of the supply of water to London being placed under the control of a public body; and secondly, that it is satisfied that that body should be the County Council. The Committee before which the Bill will come must settle the details of the transfer, and we may expect a long and troublesome discussion and examination of the present project. While we altogether approve of the transfer of the supply of water to a public body, we cannot wholly agree with the reasoning which would make it the County Council. In the large provincial towns the Corporation consists of many of the leading business men of the town: business men are conspicuous by their absence from the County Council. Again, London is much bigger than Birmingham, and at present the County Council has more than enough to occupy it. Again, the water-supply of London should be in the same hands as that of the surrounding districts, and this is a strong reason why there should be a central body for London and the surrounding parts, which should have jurisdiction beyond the limit of the County Council, and should represent a larger area. For the moment, however, the matter has moved on two steps by the recent action of the House of Commons. We confess that a discussion in a desultory fashion on a private Bill is hardly the way in which we should have liked to see a matter of such great importance brought before Parliament.

THE Railway Commissioners have several important test cases pending at the present time, and a great deal of preliminary skirmishing is going on between the counsel engaged upon various questions which have arisen as to the scope and purport of the new Acts. A point of considerable public importance was decided by the President of the Commission on Saturday, in connexion with an action brought by the Mansion House Association against the Great Western Railway Company. This company seems to have taken advantage of their new charging powers to a considerable extent, and have raised the whole of their rates for several "classes" between London and various towns on their line. These classes include many hundreds of articles—indeed, almost every description of traffic except that covered by special rates, these latter not having, apparently, been disturbed. The railway company are called upon to establish the reasonableness of these wholesale increases, a certain number of typical stations being taken; but they asked for more specific particulars, including the names of the individual traders aggrieved. The complainants, of course, declined to comply, and were upheld in their refusal by the Registrar of the Court. The company, however, appealed against this decision, but it was confirmed by Mr. Justice Collins on Saturday, after a long discussion in which Sir Richard Webster, Mr. Balfour Browne, and the Judge himself took part. The companies evidently intend to fight these test cases step by step, and leave was obtained to appeal further upon this point. It is quite clear that public bodies have now a *locus standi* in respect of proceedings under the Railway and Canal Traffic Acts, and it is competent for traders to avail themselves of this provision. It also seems reasonable to look to a railway company for justification of all advanced rates, whether considered singly or *en bloc*. There may be some difficulty in the

THE RESTORATION OF BRISTOL CATHEDRAL.—A meeting of the executive committee for the restoration of Bristol Cathedral was held at the Deanery on the 19th ult. It was reported that the Chapter had decided to light both the choir and nave by electricity, and that the work was in progress. The architect's designs for a dossal, side curtains, and altar rails were approved, and the estimates accepted. The dossal will be fixed behind the holy table, as a temporary substitute for a reredos, and the curtains will occupy the position of the north and south sedilia until these features of the restored choir can be provided. Mr. Pearson's drawing for the choir screen was then examined and approved. It was resolved to proceed at once with the erection of the base, or lower wall, of the screen, in the hope that funds would shortly be forthcoming to complete it. The question of laying out the west front with carriage-drives and grass also came under consideration. Mr. Pearson has stated that the effect of a grassy foreground would enhance the beauty of the west front, and greatly improve the general appearance.

latter case, but the rates complained of being raised in the wholesale manner described, this application was also framed on general lines.

THE law in regard to nuisances to residential property has been long settled in its general principles. The chief difficulty at the present day is in its application to particular circumstances. The case of *Husey v. Baily*, recently decided by Mr. Justice Chitty, is an illustration of this. The defendant built a villa and workshop close to the plaintiff's residence, and in the workshop he placed two circular saws, and it was the noise of these saws which, as alleged by the plaintiff, constituted a nuisance. Most persons know the various noises which are caused by saws—the buzz and the shriek; when these continue from six in the morning to six in the evening, at a distance of some sixty yards, it is pretty clear that the judge was right in holding that the plaintiff was entitled to relief. The case is an example of the result of what may be called cumulative acts of a disagreeable character becoming a legal nuisance. It is doubtful if the action of a saw for an hour in the day could be regarded as a nuisance, but when the noise continues for twelve hours the matter is different. The case of *Lambton v. Mellish*, which was decided by Mr. Justice Chitty last year, is an even stronger example of this. The defendant in that case had merry-go-rounds on the ground for the pleasure of excursionists, and these were alleged to be a nuisance by the plaintiff, who lived at a distance of 70 yds. In the judgment occurs the passage which is of practical interest: "A man may tolerate a nuisance for a short period. A passer-by would not find any nuisance in these organs; but the case is very different when the noise has to be continuously endured." Again, speaking of a noise made personally by two men, Mr. Justice Chitty said: "Each of the men is making a noise, and each is adding his quantum, until the whole constitutes a nuisance." These illustrations show the tendency of the law to protect owners of houses against prolonged inconveniences which in the aggregate amount to a legal nuisance. A still stronger illustration was given by the late Lord Justice James in reference to the obstruction of a right-of-way. One man, he said, may leave a wheel-barrow standing on a way, and it may be no appreciable inconvenience, but if a hundred do so then a nuisance is caused which the law will stop. These matters are well worthy of the attention of householders and their neighbours. The cases referred to are of good augury for household comfort, since they show that the law will not tolerate the defence that what is merely an inconvenience if it occurs for a short time retains the same character if it is continued hour after hour.

WE receive intimations that the Building Trades Exhibition to be opened this spring at the Agricultural Hall is to be superior to its predecessors, that no less than ten firms will show brickmaking machinery in motion, and that Messrs. Kirkaldy & Sons and Messrs. Fajja & Co. are arranging a series of tests of bricks, cement, and other materials. These should be of interest. We have heard so many annual promises of this kind that we get rather sceptical, but perhaps things will be better this year. If so, it is to be hoped that those concerned with these exhibitions will be wise enough not to attempt repeating them annually. Any such attempt is bound to be a failure, because there is not a sufficient amount of new invention or new appliances in connexion with building to supply matter for a large annual exhibition. The result is (what we have already seen) that the thing degenerates into an annual exhibition of advertising stands, where there is scarcely anything new to be seen. A good building trades exhibition might very well be held once in five years, and then there would probably be

matter of interest in each exhibition, and it would be worth doing. But it is not worth while to attempt it every year.

THE opening of the garden of Lincoln's Inn-fields to the public on Saturday last is an event upon which London may be congratulated. In these "Notes" we have for several years consistently advocated the opening of these grounds to the public in the interests of all classes. The reasons for this course have been so clear that our only regret is that the opening has been so long opposed by those who had some private rights over these gardens. The main want of this part of London now is the making of some direct communication between Holborn and Lincoln's Inn-fields. There should be direct access from this square to Holborn. This could easily be made at the north-east or north-west ends of the square, and there can be no doubt that of these places the north-east end is preferable, as there would then be a straight road from Holborn to the Carey-street entrance of the Law Courts.

A PUBLIC meeting held a few years ago at Rothwell, Northants, resolved to commemorate Her Majesty's Jubilee by completing the Market-house. The Local Board have now undertaken to convert it for purposes of a public library and offices. They have appointed Messrs. Gotch & Saunders, of Kettering, as the architects; and the tender for 753*l.* of Mr. J. C. Neal, of Kettering, is accepted. The house* was erected in the interval 1575-80 by Sir Thomas Tresham, who in 1593-95 built the Triangular Lodge and enlarged his own home (to which the Cockayne added) at Rushton; he also is believed to have begun the Lyveden New Bield. Perhaps designed by John Thorpe, and faced with Stanion or Weldon ashlar, the Market-house has a ground-story entered through eight wide semi-circular arches, and an upper story (without floor or roof), to be gained from within the open arcade by a staircase in a rounded projection at the south-east angle. Ornamented pilasters are attached to each story, the two sides having an elevation not unlike the façade of Brescia Town Hall, which we illustrated on February 23 last. A dedicatory Latin inscription is cut in the lower frieze; the upper and deeper frieze contains a series of shields tricked with the coat-arms of Tresham's friends, whom, as he here says, he thus purposed to honour; one shield displays the arms of the Humphrey Stafford who employed Thorpe to design Kirby, 1570.

THE inconvenience and unfairness of requiring a deposit fee from architects for the instructions for a competition, and not returning it except when a set of plans are sent in, is illustrated in a brief correspondence which has been sent to us in regard to the Penzance Hospital. An architect asked for information as to the number of beds required, in order to judge whether the limited sum named in the advertisement would suffice for any properly-planned and constructed building, and was merely told that he would have the information on sending his guinea. As the object was, in fact, to know whether it was worth while to go into the competition at all, the answer was of course merely an invitation to gamble away a guinea on a chance. Such foolish conditions may keep good men out of a competition.

THE Exhibition of Water-Colours of the Dudley Gallery Art Society contains a good many very pleasant small drawings and sketches, and some of exceptional excellence. Among these latter are the studies of shipping subjects by Miss Nora Davison whose talent in this class of subject we have before remarked; Miss Margaret Bernard's broadly-executed sketches, especially "Haymaking, Dorset"; Mr. J. Carlisle's "Hampstead

Heath"; Mr. Newton Benett's charming little drawing of "Abingdon"; and Mr. Geo. Marks' "Village Street, Sutton Courtney."

A PENNY architectural journal recently started has devoted an article to attacking the editor of this journal, and, among other things, endeavouring to convey the impression that he had sent a gratuitously discourteous reply to a request to print his paper on "London Bridges," threatening the editor of the penny journal with legal proceedings if he printed it. The editor of the latter did not of course think it necessary to inform his readers that this threat was only held out after he had in two weeks purloined no less than six or seven columns of matter from the pages of the *Builder*,* and that the legal representatives of the *Builder* had found it necessary to serve him with a formal warning that any future appropriation of our matter would be the subject of summary legal proceedings. These threats seem to have stopped his depredations, and he has endeavoured to revenge himself for this by printing and circulating an insulting article on the editor of the journal whose columns he has been pillaging, and who has given him a practical and, no doubt, unwelcome lesson on the distinction between *meum* and *tuum*.

LETTER FROM PARIS.

As has already been mentioned in our Foreign Notes, four architects, MM. Hénard, Sottais, Tronchet, and Varcollier, have been appointed to assist M. Bouvard in elaborating the final plan for the Exhibition of 1900, which M. Picard proposes to lay before the Chambers this year, before the Parliamentary vacation. On this account the scheme for the new avenue between the Champs Elysées and the Seine is to be immediately taken into consideration, as well as the construction of the monumental bridge over the Seine on the axis of the Esplanade des Invalides. This bridge will not carry any superstructure such as will intercept the view up the river. The Palais de l'Industrie, it appears now, will necessarily disappear, as well as the pavilion of the Ville de Paris, and will be replaced by a new building on the alignment of the future avenue. The principal entrance to the Exhibition will be on the Place de la Concorde; and the buildings devoted to decorative exhibits will be placed along the line of the Cour-la-Reine and the Esplanade.

The Electricity building will be as near as possible to the entrance, probably on the same esplanade. The banks of the Seine will be lined with decorative façades, as much varied as possible, but kept sufficiently back from the bank to allow space for the circulation of a crowd in front of them, which was not possible in the 1889 Exhibition. The special exhibitions will be arranged around the Eiffel Tower, which after all it appears is not to be interfered with, unless the Society to which it belongs think proper to redecorate it for the occasion.

The Galerie des Machines will also be retained, but modified and decorated. The Palais des Beaux-Arts and des Arts Libéraux, on the other hand, are to be removed, as well as the central dome, the "Thirty-metre Gallery," and the existing terraces round the gardens of the Champ de Mars, the varying levels of which might be the cause of accidents on fête-days. Between the Galerie des Machines and the Seine, therefore, there will be an immense open space, forming an unbroken inclined plane, laid out in parterres and ornamented with sculpture. In front of the Galerie des Machines there will be a monumental fountain with a basin. Nothing but the Eiffel Tower will interrupt the view from the lower end of the Champ de Mars to the Trocadéro, in which latter the Colonial Exhibition will be

* To wit: Two long reports of Professor Aitchison's lectures, only to be got from our columns; the whole of our condensed report of three papers read at the Institute, reprinted word for word; two paragraphs of special news, one paid for by us, the other furnished specially to us by a member of the A.A. Discussion Section; "Prices Current of Materials," compiled for our columns from sources available to us; this last was graciously headed "from the *Builder*," an attention which makes no practical difference; we do not go to the trouble of compiling them for other journals to use them. Will anyone wonder that after this we took a peremptory stand against further use of our matter?

* See Mr. Gotch's measured drawings, with plans, the *Builder*, March 8, 1890.

installed. At this point there is no thought of constructing a new bridge, as the Pont d'Iena is sufficient for all purposes of communication between the two banks. This general sketch of the proposed arrangement corresponds, it will be observed, pretty closely with the design by M. Hénard, published in the *Builder* of Feb. 16; and the selection of this architect as a collaborator of M. Bouvard seems to indicate that his design was regarded with special favour.

One of the first acts of the new Minister of Commerce and Industry, M. André Lebou, has been to address a circular to the Prefects of Departments inviting them to form departmental committees for the organisation of the 1900 Exhibition. These committees will have important work chiefly in connexion with the retrospective exhibition of industrial products. The exhibition of art will be limited to the works of the nineteenth century, while the historic exhibition of ancient art will embrace an *ensemble* of decorative and industrial art from the origin of French civilisation down to the year 1799. A methodical and chronological grouping will enable the visitors to follow the changes of taste and the progress in technique of different arts, as well as the modification of French manners, habits, and requirements at different times. A great deal of research will be necessary to carry out this programme, and it is here that the labours of the departmental committees will be of the greatest service.

The 1900 Exhibition therefore is fairly started on its preparations, and everything promises well if we can only have sufficient means of communication. But, thanks to the veto of the Municipal Council, we cannot count on a metropolitan railway. The only resource left is to finish the railway from Moulineux to the Invalides as soon as possible, to duplicate the existing line from Auteuil, and to increase the service of mechanical tramways, by arranging for the traction of several carriages by one motor, as in the new line from the Louvre to Versailles. These will only be half measures, in presence of the probable enormous influx of visitors, but they will be an improvement on the present state of locomotion, which is quite unworthy of such a city as Paris.

We have already described the intended monument to de Maupassant in the Parc Monceau. There is now talk of erecting in the same park a monument to Georges Bizet, the composer of "Carmen"; and a committee has also been formed to erect there a monument to Corot. This monument, executed in coloured glazed ware by M. Cros, the sculptor, will be placed in the middle of the colonnade known as the "Nau-machie." When we add the monument to Gounod, there will be in the Parc Monceau a kind of open-air "Poet's Corner." Some people profess to think that the pretty little park will have, with all these monuments, a kind of cemetery aspect; but there is hardly any reason for such an apprehension. The monuments to Delacroix and de Banville, in the Luxembourg Gardens, do not suggest any funeral ideas, and on the contrary, contribute to the decoration of the promenade. It will be the same in the Parc Monceau; and the selection of M. Formigé, who is architect for the Promenades of Paris, as the architect for the Gounod monument, gives one every reason to expect a good result.

The demolition of property will shortly be commenced for the prolongation of Rue Reaumur, which at present stops at Rue St. Denis, and the completed length of which is to extend to the Place de la Bourne, opposite the Rue du Quatre Septembre. These operations will obliterate several old streets, and will open out one of the towers of St. Martin de Champs, at present built up among a mass of inferior houses. This tower, square on plan and 15 to 20 metres in height, is near the ancient refectory of the priory. It dates from the commencement of the eleventh century, and is decorated with arcades springing from capitals carved with heads, animal subjects, and foliage. At the base of the tower are the remains of an ancient chapel; the mouldings and ornaments show its date as the XIVth century; it is at present occupied as a machinery shop. When disengaged and restored under the care of the "Commission des Monuments Historiques," the tower will be recognised as one of the most curious monuments of Old Paris.*

The Minister of Instruction and Fine Art has been petitioned with a petition from the numerous

admirers of the works of M. Paul Chenavard, the painter—now eighty-eight years of age—asking that his large composition, "Le Philosophie de l'Histoire," should be executed in mosaic at the place already indicated by the painter, under the cupola of the Pantheon. In fact, Chenavard was to have had the decoration of the Pantheon to himself. But his designs were not carried out, and were collected about ten years ago in the Museum bearing his name and founded by him, at Lyons.

The Museums Administration has just purchased from M^{me}. Carpeaux the series of models of busts executed by her late husband, and which were exhibited two years ago at the Ecole des Beaux-Arts. These works, to the number of ten, include eight busts, two of them after Napoleon III., one after Dumas *filis*, and a sculpture sketch entitled the "Jeune Mère." These will be placed along with the other works of Carpeaux now in the Louvre. The room called the "Seven-mètre Gallery" at the Louvre, where the early pictures are hung, has been re-arranged with very good result. The new installation allows the works of Cimabue, Giotto, Bartolo, &c., which for many years have been hung too high and in a bad light, to be much better seen. This new classification, however, is only an instalment of a much more extensive reform in the hanging at the Louvre, which ought to be carried out to its completion without delay.

The "Femmes Peintres et Sculpteurs" will open their annual exhibition in a few days. Among minor exhibitions now open is one of the landscapes of M. Ernest Baillet, at the Georges Petit Gallery, and, at the Théâtre d'Application in Rue St. Lazare, that of the works of MM. Schuller and Armand Bertou.

M. Tony Noël, holder of the Grand Prix de Rome, has been commissioned to execute a bust of M. Faure, the President of the Republic.

We must record the promulgation of a law long desired by artists, and which will give them some defence against the frauds often practised at their expense. According to the terms of this law, those who fraudulently place an artist's name on any work of art, or those who imitate the signature of an artist in order to deceive a purchaser, will be liable to a term of imprisonment varying from one to five years, and a fine of from 16 to 3,000 francs, according to circumstances, without prejudice to procedure against them for damages. The same law will apply to the putting up for sale of objects of art under forged signatures.

THE ADVANCEMENT OF ARCHITECTURE.*

Planning.

BY PROFESSOR AITCHISON, A.R.A.

THE art of planning, when it is taken in its most comprehensive sense, means the devising of the whole building, not perhaps in all its details, but certainly in its main masses; and if we credit the architect who plans with a knowledge of construction, and of the appropriate forms the construction should take, we may say that the plan comprehends the effect of the whole structure.

I may mention that the present Persian architects only give a plan which includes the stalaotite vaulting and cornices; the builder knows the height of the doors, window-sills, and windows; the shape of the arches and of the stalactites; and it is only when some new pattern of vaulting, a monogram, or some new ornament is wanted that any elevation or detail is given. When the architect has got his instructions, and the plan is made, it is shown to the client, and he is asked what vaulting he would like, all the usual patterns being known by name. Should the client be a man of taste or fashion, who wants a new pattern of vaulting, the architect produces his pattern-book, and shows his own designs for new sorts of vaults. This method of keeping patterns on hand was rife two generations ago in London; architects who went out to dinner kept designs for a house, a mansion, or a chapel in their pocket-books, to show a possible client; and it has not yet quite died out. This practice seems to be in vogue in our colonies. Froude, in his "Oceana," tells us this about the Government House at Victoria (p. 66): "An architect was selected, a site was chosen, and the architect, as I heard the story, was directed to produce a plan. He sketched a Gothic construction, which was wisely disapproved as out of character with the climate. The Minister of Public Works asked to look at his book of designs. On the first page was Osborne. 'Something like that,' the Minister

said, 'on a scale slightly reduced'; and the result was the present palace—for such it is—not a very handsome building, in some aspects even ugly, but large and imposing."

There are two transcendental possibilities attaching to the art of planning: 1st, that of grouping in the most convenient way the various chambers of a large utilitarian building, so that the plan not only looks organised but inevitable; and 2nd, in the case of buildings for high ideal purposes, not only devising a well-organised plan but a plan containing such forms and arrangements as will evoke the proper emotions. I am not sure that every building, every structure, and every tool and utensil will not at some future time be endowed with a certain amount of comeliness, if not of beauty, except such as are intended to create aversion, fear, horror, or disgust. We see that Nature tries to effect this in her works, and, probably, when she has not succeeded, the conditions may render it impossible; but this may not always be the case, and Nature may become wiser or more skilful, or the conditions may become more favourable; and if not on this earth, in some other sun or planet. Considering that man is but a complex machine, most beautiful when he becomes most perfect for the work he has to do, we may hope that when we get wiser and have more command over our materials, engineering works, machinery, musical instruments, and utensils may become beautiful too. I shall, however, confine myself not only to present possibilities, but to those plans that are wholly or partially devoted to high ideal ends. I think it may be said that those buildings that were devoted to religious uses were for the highest ideal ends during the ages of faith; whether that faith was pagan, Jewish, Buddhist, Mohammedan, or Christian. It is not easy to say what was considered the highest end to which buildings should be devoted in ages when faith did not prevail. I think we may take Juvenal's remark, that no boy above fourteen ("Sat." 2, 152) believed in the stories about the gods, as showing an age that was not one of faith, though we may possibly accept Gibbon's dictum "that the various modes of worship which prevailed in the Roman world were all considered by the people as equally true, by the philosophers as equally false, and by the magistrates as equally useful." Vespasian built the Colosseum over a part of Nero's golden house, and though the use to which the Colosseum was put was popular, it cannot be looked on as embodying a high ideal.

Julius Cæsar, Augustus, Nerva, Trajan, and others built forums, and most of the forums contained a basilica, while Constantine finished the basilica of Maxentius. Vast and important baths were built from the time of Augustus to that of Constantine, and these baths had adjuncts of gymnasiums, lecture-halls, libraries, and concert-rooms, so there was everything comprised in them that invigorated and perfected the body, and refreshed and stimulated the mind. We now know that the Pantheon, a temple to all the gods, never was the laconicum of Agrippa's baths, and was not built earlier than the age of Hadrian. The palaces built by the Emperors, from the days of Augustus to those of Septimius Severus, if not representing the highest ideals, were for a very high one, for they did not represent the power and magnificence of a single person, but the majesty of Rome. That the Emperors were considered as the incarnation of the power and majesty of Rome is, I think, shown by their deification. I think, too, that we may consider the ceremonial employed at the public interviews of foreigners with the Emperor was very elaborate, at least among the later Emperors; for, till the days of Nero, the position of the Emperors was not very secure, and they naturally sought to avoid envy and hatred by affected simplicity. Even in the days of Augustus the number of menial slaves was enormous; one instance may suffice—Livia had one slave, whose sole business was to comb her lapdog.

As regards the accommodation, there must have been the private rooms of the Emperor and Empress, the rooms for the public receptions of the great Officers of State, as well as State dining-rooms; and there were always cases reserved for the Emperor's decision, those particularly relating to the feudatory kings. We know little about the uses of the various rooms of the palaces, but there is a well designed air in the plans of the palaces, as may be seen in the Palace of Augustus, published by Guattani; the restoration of the Flavian Palaces by M. Deglane, and in the villa of the ex-Emperor Diocletian at Spalato, restored by Robert Adam.

Before saying anything about the plans of buildings that have struck me, I will say some-

* On this side of the Channel, some of us would perhaps think that this "restoration" is just what would prevent its being recognised as such.—E.D.

* Being the fifth Royal Academy Lecture on Architecture this Session. Delivered on Monday evening, February 11, 1895.

thing on the art of planning. Certain requirements have to be provided for in every building, utilitarian, emotional, or compound. The more perfectly utilitarian the building is, the more exactly must the needs be met. This is as useful a practice for an architect, as the attempt to make a maxim is for a writer; for in a maxim you do not want a single unnecessary word, so that both exercises teach conciseness in their separate arts. You see in most animals all the organs so packed as to make a symmetrical whole of some generic type. We cannot as a rule improve upon Nature, so it is well that our plans for practice should be in a town where everything must be included in the given space; for in the country, where land is cheaper, it is enticing to one's idleness to stick on parts outside instead of recasting the plan; at least, if we do not consider that Nature never skewers on the giblets of a fowl as the cook does for roasting. Supposing the utilitarian plan is of many parts, a first-rate planner will generally be able to organise it so as make a whole, and thus prevent it from showing that it has been made off-hand from the mere aggregation of the bits of card representing rooms. Mr. Macvicar Anderson, the ex President of the Royal Institution of British Architects, delivered an excellent address on planning in 1892, from which I have been allowed to quote. He says: "I would say, further, that a plan, to be good, must be simple. No doubt the arrangement of some buildings is necessarily more elaborate than that of others; but you may take it as an unerring guide that when you find a plan becoming complicated and confused, you are on the wrong tack. I have seen an artist, after hours of work, wipe from his canvas all he had painted, and then make a fresh start with manifest advantage and no real loss of time; so, when your planning results in complication, your best course is ruthlessly to obliterate what you have done, and begin *de novo*. Nothing will compensate for the absence of simplicity in a plan. This is a golden test which I have never hesitated to apply, and I speak from no inconsiderable experience."

On the subject of simplicity I give you another quotation, though I know that quotations are unpopular, for a lecturer *should* know everything; but one is in this dilemma: if one does not quote, one must either deprive you of information or adapt it as one's own; in the first case it is hardly fair to you, in the latter it is hardly fair to the discoverer. M. Anatole France says: "The only difficulty is to define the simple form, and it must be allowed that this difficulty is great."

Nature as we know her in the medium set apart for life offers us nothing simple, and art cannot pretend to greater simplicity than Nature. Still we understand well enough when we say that such a style is simple and that another is not.

I should say then that if there is not really a simple style there are styles that seem simple, and that it is precisely to them that youth and duration seem to be attached. There remains nothing then but to seek whence comes this happy semblance, and one doubtless thinks that they owe it not to this but that they are less rich than the others in different elements; but to their forming a whole where all the parts are so perfectly melted together that one can no longer distinguish them. A good style, in fact, is like this ray of light which comes through my windows as I am writing, and which owes its pure clearness to the intimate union of the seven colours of which it is made up. The simple style is like white light. It is complex, but it does not seem so."—"Le Jardin d'Épiqueure."

As an instance of a plan of most charming simplicity, I may mention the baths of Agrippa,* pulled down for a palace in the sixteenth century. Fortunately we have in Palladio's drawings all the plans of the baths that were standing in his day, from Agrippa's to Constantine's; and though the building of these ranged over three hundred years, in which time certain modifications probably took place in the exercises, entertainments, and methods of bathing, they were for one purpose; they are in this respect like the Gothic cathedrals, all built for one purpose, though the ritual differed at different times. Thanks to Abel Blouet, as well as to the sublime ruins, the baths of Caracalla† are mostly put forward as a type of planning, though I think the plan of them is by no means so good as that of Agrippa's; for the plan has a look of being sought for, while that of Agrippa's has a look of perfect simplicity and inevitableness. This look of naturalness and simplicity is the stamp of perfection in every fine art.

The secret of getting an ordinarily good and organised plan is the taking of infinite trouble; but the masterly plans of the world are due to that and to genius as well. There is a comic-looking secular Egyptian plan of a pavilion at Medinet Habou,‡ that looks as if it were made

PAVILION AT MEDINET HABOU



100 FEET

from the curling-tongue of Pharaoh's wig; but probably if we were familiar with the site and the purpose, it may have taken this form from its use, and the desire for air and shade. The plan of the Pantheon is that of a single and simple structure, but it has the merit of being fine even on paper. All the chapels form effective masses of shade round the well-lit circle, while the monolithic columns of Giallo antico or pavonazetto that continue the circle and form the fronts of the recesses, greatly add to the interest and effect. The marvellous effect of the interior is, however, mainly due to the lighting.

All praise, however, is due to the unknown architect who saw how solemn was the effect of the laconicum of a bath, and used the shape for this high æsthetic purpose. Those who have not been to Rome, have doubtless seen it in the marvellous drawings of M. Chedanne.

It at first seems curious to us that some of the rooms of Augustus' palace have a Byzantine air, until we reflect that Constantine's buildings at his new capital were copies of Roman ones, and that Greek or Roman architects probably settled at Byzantium as soon as it became the metropolis. Some of the rooms of this palace, on the lower level adjoining the grounds of the new temple of Vesta, are of what we should call Byzantine shapes, *i.e.*, are full of large niches or apses not unlike the golden Throne Room of the Imperial Palace at Byzantium.† The centre room of those at the Palace of Augustus is said to have been used by him as a hall of justice. Drapery was then much more used for division than it is now, and it is quite possible that these niches held officers, servants, guards, or things wanted.

At the golden Throne Room of Byzantium the face of each niche was closed by curtains, and used for some special purpose. At Diocletian's Villa at Spalato there were triconques;—that is, rooms of three apses, with columns forming the straight side—to the suites of baths both for the ex-Emperor and Empress; whether they were ante-chambers or cooling-rooms is not clear, but they resemble the triconques at the Imperial Palace at Byzantium. As regards the plans of large buildings containing many rooms, the only test of their goodness is the familiar one of the pudding. If persons can easily find their way from the entrance to the rooms they want, and find their way out again, and if those who use the rooms find them of the shape and size wanted and conveniently situated, the plan is good. The barristers engaged at the Houses of Parliament are loud in their praises of Sir Charles Barry's plan. Unless you have great experience of the working of any large building, you can only judge of a plan by its look of well-organised simplicity, though when the plan is on an ugly and irregular piece of ground you can see the skill displayed. The difficulty of forming a correct judgment of a plan on paper, without having used the building, may be well illustrated by a door in some awkward place in a plan you have arranged; you may take hours in considering which way it should be hung to be most convenient; but no sooner is the building used than the occupier at once finds the convenient way, and woe betide the architect if he has arranged it wrongly: "Incompetent blockhead!" will be the mildest obprobrium. I may say that in a hall where there are many doors it is well to mark by architectural enrichments—by having the door in two leaves or higher—the principal doorway to the inside or to the first-floor staircase. In a cold

and windy situation an architect made an inner hall in which there were seven doors all alike. When the house was virtually completed and the architect was about to pay his visit, the owner, who lived near and had at last learned which was the door to the inside, ordered the clerk of the works to have all the doors closed; and when the architect came in he said it would be impertinent to open the right door for the designer of the house. The architect thought for a moment, and then made for one of the doors, this went to the basement; he then tried two others unsucessfully, and was obliged to get the clerk of the works to show him the right one.

By confining myself to those places I have seen that were made for emotional effect, one can at least say what effect the arrangement has had on oneself, but in this case many things besides the plan combine to produce the effect, and particularly the lighting. The strangest effect I have noticed is the interior of the mosque at Cordova; the forest of columns form diagonal vistas which give a peculiar and striking air to it, and it is like nothing else I have seen; still there is nothing particularly beautiful or artistic in the mosque beyond the rarity and extraordinary strangeness of the multitudinous columns and the strange network above and between them. The building that affected me most by the unusual shapes used and by the grandeur of their sizes was Santa Sophia. The apses have a diameter of over 100 ft., while the smaller ones cut out of them are upwards of 40 ft. across. As I have said before, size and vastness have a great effect on the human mind quite irrespective of any reflection, and when we do reflect it seems reasonable enough, for besides showing the expenditure of great wealth and the labour of innumerable men, it shows superior capacity in the architect. The dealing with large masses successfully is in itself a great feat. A chair, though it involves many statical problems, is left to the experience of the chairmaker; but one tries to get a marble colossus ten times life size would require the highest knowledge of statics and of the strength of materials. You know that a tree-stump, or some other support, is put under the belly of a marble horse with a rider.

The immensity of Santa Sophia seems to be the great factor in the impression, but to be sure of this we want to see the same building in bare stone, for doubtless the skilful lighting, beauty of colour, and costliness of material are aids to the success; still, the Church of Saint Sergius and Bacchus, though almost the same in form as Santa Sophia, produces a very feeble impression, as compared with the grand cathedral of which it was the prototype. I have always longed to see St. Front at Périgueux, as there you have Saint Mark's without any of its coloured marbles and carving, and the gorgeous effect of coloured mosaic on a gold ground.

Almost all the ancient churches and basilicas of Italy that I have seen, when they have not been too much bedevilled, have a very impressive effect.

Where the choir is considerably raised above the nave, and reached by flights of steps, it arrests our attention by its novelty. San Miniato at Florence, San Lorenzo outside the walls at Rome, and the Renaissance Church of Santa Maria dei Miracoli at Venice, have this feature. Many of the ancient churches, such as those at Torcello, San Ambrogio at Milan, San Clemente, Santa Maria in Co-medina, and Santa Maria in Trastevere at Rome, have a solemn and dignified appearance, even when the workmanship is not good; probably the antique rules were still known, and the antique taste had not then departed. Many, too, have the splendid Alexandrian pavement and sumptuous ambos; but it is difficult to say exactly what is owing to the lighting, what to the lovely materials and the art displayed in them, and what to the shape of the plan. San Miniato, for example, has a sunset glow in the choir from the pavonazetto shutters. Few of the Italian churches have the choir boxed in, like a casket in a packing-case, but leave their altars open or surrounded by an open screen. At Florence, the cathedral has only a low enclosure round the altar; the open circular colonnade round the altar of the cathedral at Verona is very effective—by San Gallo, I think. The boxing up the choir, at any rate in front, utterly spoils the view in many Western cathedrals, and does to a great extent at Milan.

The interior of the church of Belem, at Lisbon, as seen from the gallery at the west end, has an impressive solemn effect.

There are three very striking interiors of modern churches at Venice; two by Palladio, 11 Redentore and Saint Giorgio Maggiore, both cruciform in

* See Ferguson's "History of Architecture," vol. I, p. 121, 1874.

† No. 95. Imperial Palace at Constantinople, *Builder*, February 21, 1891.

‡ *Builder*, March 1, 1890.

§ *Builder*, February 21, 1891. Room No. 73.

* Published in the *Builder* of March 2, 1889.

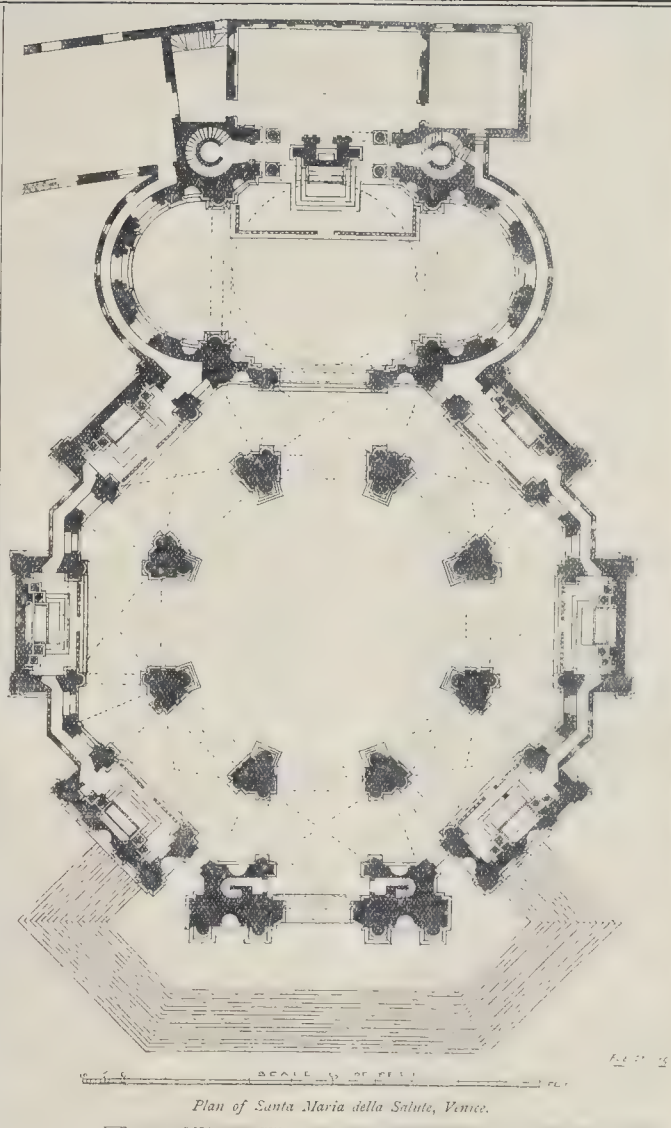
† Published in the *Builder* of February 16, 1889.

plan; in the first the arms of the cross are formed by two apses, with a third apse of columns behind the altar. The two apses forming the transept start from the lines of the nave, the dome being over the centre of the triconque. In San Giorgio, besides the interruption of the comparatively dark vault by the light from the dome, there are at the back of the altar, two columns of a lower order; this order forms the impost of the nave arches, and these columns help to support the organ. At the sides and over the top of the organ, and through the columns, glimpses of the choir are seen. By this device the whole length of the church, some 275 ft., is indicated, if not absolutely seen.

Santa Maria della Salute at Venice, by Baldassare Longhena, the architect of the Pesaro Palace, is very artistically planned; the body of the church is an octagon, with a recessed chapel in six of the eight sides. One of the remaining two sides contains the door, and the other an opening opposite the altar. The great dome is carried on an inner octagon which forms the nave. Between the aisle and the high altar a long oval chamber is interpolated, well lit at each end, and with the secondary dome over it. Thus the beholder, in looking from the nave to the altar, looks from light across the darkish aisle through the light oval into the comparative darkness seen beyond the altar.

As a rule, a touch of mystery is wanted to give the highest value to human work, for without it the work claims to be perfect and challenges criticism. However perfect a work may be, it is not so perfect that the imagination cannot suggest something different and usually better, while mystery leads the mind to try and fathom it, instead of trying to depreciate the work; you enlist the imagination in your own favour instead of forcing it to fight against you. This is partly the reason why sketches of pictures or sculpture are preferred by artists to finished works; the looker-on seizes on the idea, and not only wonders how the work will be completed, but can complete it in his own imagination, and according to his own taste and fancy.

Important buildings among the ancients mostly had an enclosure round them, called by the Greeks *peribolos*, which secured important artistic advantages, for it not only confined the view to a proper distance from the main building, but the buildings forming the enclosure were usually lower and less ornate than the main one, and thus acted as a foil to it. Remains of this enclosure are to be seen at the ruins of the baths of Titus and of Caracalla, while at those of Diocletian the great theatre, for seeing the running matches, alone remains, 483 ft. 6 in. in diameter, which is now the Piazza dei Termini. Sir John Vanbrugh understood the advantage of this enclosure, and to the fronts of those two palaces he built, Castle Howard and Blenheim, he made what may be called artificial courtyards, so that the effect he had produced might first be seen at the proper distance. [See lithographed plans in this issue.] In spite of the coarseness of his work, his inclination to proportions that are not happy, and to forms that are both original and ugly, he was a perfect master of scenic effects, and his plans are admirable. The plan of Blenheim may be roughly described as follows:—The main building is an oblong, about 350 ft. long and a little more than 100 ft. deep, and at either end it is finished by a narrow apse, the flanks extend in the same line beyond the apses some eighty odd feet. In the centre of the front a square mass of about 64 ft. projects, consisting of steps, a portico, and a piece of the grand entrance-hall. The front, including the portico, is about 132 ft. long, and after a small break a quadrant is formed on each side, enclosing the main front like a frame; a similar feature exists in Mansart's palace for Gaston d'Orléans at Blois. Another break at each end of the quadrants brings them back to the wings, some 40 ft. wide, which project some 87 ft. from the walls at the sides of the portico. The front is higher, by the entablature and balustrade, than the walls at the back of the quadrants, and the top of the colonnaded quadrants are about level with the sill of the first floor windows of the front. The ends of the wings are wholly rusticated, and are higher by the entablature than the parts behind, and have above them open arcaded structures with finials on their tops. Behind and over the pediment of the portico, is another pediment, the ends of which project so as to make a deep shadow on one side. The plan, as far as its accommodation is concerned, is thus arranged:—A vast entrance-hall, about 58 ft. by 43 ft., leads to the corridor, about 10 ft. wide, surrounding the main rooms, and



beyond that is the saloon, 44 ft. long by 35 ft. wide, with ante-chambers on either side, leading into the saloon at one end and drawing-rooms at the other, which last lead into State bedrooms, with a state cabinet beyond on the left hand, and into the gallery on the right. The right wing is wholly occupied by the great gallery, 181 ft. long and 21 ft. wide in its narrowest part and widened out at the centre and ends; the middle is 31 ft. wide exclusive of the apse. The left wing contains a vestibule, bedrooms, ante-rooms, wardrobes, &c. The corridor runs right round, forming a passage, except when interrupted by dressing-rooms and wardrobes, &c., and returns into the grand hall, thus leaving two interior courts about 32 ft. by 42 ft., with private rooms beyond the courts. Beyond these and on each side of the entrance-hall, are two narrow double flights of stairs. On either side of the grand courtyard, which was designed to have a portico all round it, are the stable and kitchen courts. There are six back staircases, and some small rooms as well. The main building is exceedingly massive; the clerk of the works said "here all the 9-in. walls are 4 ft. thick." One cannot give too much praise to so excellent and well-organised a plan, and I may say that all the state-rooms are *en suite*. The saloon was probably the state

dining-room, and we think that if the dishes had to be brought from the kitchen court, they would not have been very hot when served. The interruption of the corridors by small rooms is not to our ideas happy, more particularly as it would turn the great gallery into a passage, but one has to consider that the great Duke had passed much of his life abroad, where passing through rooms to get to the main one is rather aimed at than avoided; and we do not even know the customs of England when the great Duke was in all his glory. The plan of Castle Howard, which was the first built, is based on the same motive as Blenheim, though treated differently; here the quadrants are the same in plan as those at Blenheim, though smaller, but instead of being colonnades they are rusticated arcades, and there is a dome over the entrance-hall. The wings extend in front of the main structure about 132 ft., instead of about 86 ft. as Blenheim. The garden front is very superior, architecturally, to that of Blenheim, and of nearly the same length, being 300 ft. long, while that of Blenheim is 323 ft. As regards the internal arrangements, the hall is nearly square, with a corridor in front of it, about 7 ft. wide, and is between twin staircases on either side, with a room on each side beyond them; beyond the staircases, towards the

garden front, there is another corridor about 8 ft. wide between them and the state apartment, but there are no internal courts. The state apartments, consisting of twelve rooms, which, with the corridor, form a single line; the wings are detached from the main body, and only connected by the front corridor; the right one, looking at the front, contains the chapel and some other rooms, and that on the left contains the hunting-rooms. There are two staircases to the corridor of the state apartment, two to the wings to reach the upper floors, and one back staircase to the left wing. A kitchen and a stable court were originally designed, but to the best of my recollection the kitchen court was turned into the stable court. It is not so compact a plan on paper as Blenheim, but the absence of the enclosed courts must make it more healthful. There is in the park a most charming square summer pavilion by Sir W. Chambers, with projecting porticoes and pediments on each face and a dome.

As in both the cases mentioned, the state rooms are on the ground floor; grand staircases were not wanted.

Had Inigo Jones been able to finish Greenwich Hospital as he intended, the effect would have been grand, but now the vista only leads up to a mean house.

I may say here that a really noble staircase is rarely to be found in any palace or mansion, the space required for it being mostly too great. The most magnificent staircase I have ever seen is the Scalinata, at Rome, leading from the Piazza d'Espagna to the Holy Trinity on the Hill; by whom designed I know not. The external staircase in the courtyard of the Ducal Palace at Venice, called the "Giant's Staircase," looks well in the sunlight when you are under the vault of the Porta della Carta.

The staircase of Francis I.'s wing at Blois is very fine, but it is rather a small building than a staircase in the sense in which I am now speaking, and spiral staircases preclude much view of the stairs. Perhaps the best internal staircase for effect is that of Michelangelo at the Laurentian Library, at Florence, though, for the place, it has a touch of folly about it; one can hardly imagine the library being so crowded as to want casements at the sides for the crowd coming out; that at Ashburnham House, by Inigo Jones, is, I think, the finest I have seen in England; as, after passing through low and ordinary rooms, you come on to this fine staircase, architecturally arranged and artistically lit. The double staircase in the centre of the cross at Chambord is very fine, and I was lucky enough to see it when the intermediate floors of the cross had been removed, but it merely shows as an architectural feature holding a staircase. The Royal staircase to the Vatican, built by Bernini, is perhaps the one with the finest effect, although the architectural features are dull and coarse, but it is very artistically managed in the triangle between the Vatican and Saint Peter's, the narrowing width giving a greater idea of distance than actually exists. It has been truly said that in looking down it, it is shortened in appearance by this device, but then it is seen a hundred times oftener from the bottom than from the top. There are many staircases interesting from their peculiar treatment, but mostly they are either too small, or have some defect that takes away from their magnificence: there is a good one, but not grand enough for the place, at Buckingham Palace, a part of which leads to the Picture Gallery. There is a very striking one at Rome in a palace close to the Piazza Navona which is vaulted over the stairs from Ionic columns, and there is a well-designed one at the Comédie Française, especially when looked at from the landing to the crush-room. The finest composition I ever saw where staircases are concerned was that of Wilkin's twin staircases at the National Gallery, when the R.A. was there as well; a wall between the two staircases separated the entrances, on the top of which was a screen of Corinthian columns; standing at the top of one staircase you saw, through the screen, the people coming up and going down the opposite staircase. There is one I have forgotten to mention; it was not a success, but it might have been; it was by Sir William Chambers, at Somerset House, on the right flank entering. It is a common hanging staircase round a semicircle, with iron balusters and a thin mahogany hand-rail; but even with these drawbacks it would have been a success if it could have been carried up continuously, but from the great number of the steps it was necessary to have a landing in the middle, and this level break on each story utterly spoils it.

I do not recollect ever seeing a very effective

hanging staircase; there is a certain look of insecurity about such staircases, and not mass enough to give them dignity; except, of course, when you look up them from the landing and cannot see that they are only hanging. Where space is an object, and distance as well, it is very difficult to get a truly magnificent effect. The grand internal staircase in the Ducal Palace at Venice is spoiled by this want of distance, for it turns at right-angles, so that you only see one flight, except at the top. Even twenty-one steps is a great number to go up without a landing, and in a vista this is not much. There is a fine design for a Royal staircase in Sir John Soane's published designs. To attain grandeur you want your flights from the first landing to go out at right-angles on both sides, so that, standing on the first landing, you see the next flight to the right and left; but even then it not only leads you away from the point of entry, but does not make a whole.

In some of Piranesi's imaginative etchings, called, I think, Roman restorations, there are staircases with endless steps, leading, as it were, into infinity. There are great difficulties to be encountered when grandeur is sought in staircases. I have thought that if there were a few steps to the right and left of the first landing, as an indication of continuity; the flights might return separated from the cage by a colonnade; the objection to this is that you do not get a glimpse of the main cage until you are nearly at the top, unless, indeed, you have pedestals of unequal height with balustrades between; but the lower pedestals are apt to be too long. In the palace I mentioned near the Piazza Navona, level arches are got by making some of the columns much shorter than others—not a very happy device where the orders are used, but even this is preferable to arches stilted on one side or on the ramp. In the case of staircases, as well as in most others, variety and a certain mystery greatly add to the interest and charm; for instance, if you can look through double colonnades comparatively dark into brightness beyond. Lord Leonfield in his town mansion has a fine staircase by the late Anthony Salvin. Four great semi-circular arches stand on columns and piers on the walls of the cage 20 ft. from centre to centre, a level balustraded corridor running right round the cage behind the columns.

Planning presents us, on the one hand, with a dull and prosaic task, and, on the other, with the most imaginative and delightful occupation; but whether our task be the prosaic one or the imaginative—and it is often a mixture of the two—both have this merit in common, they equally absorb the mind; for you might as well try to sum trigonometrical series with a wandering mind as to make a plan. The architect often indulges in De Morgan's mathematical hope that "In a better state we may be able to solve these problems without the intervention of paper." By the prosaic plan I mean the arranging of many rooms of nearly the same size and full of minute requirements for some sordid purpose, and with no other end in view than their due lighting, and where nothing will be sacrificed for an organised form, and there is no desire for a rhythmical outside. The other, when the main object is to evoke some noble emotion or delight, so that while you are planning for internal effect the outside features group themselves in your mind with propriety and elegance. For advice I say study the great plans of antiquity and the best of modern times, and if any of you after all your study and striving have the good fortune to possess genius cultivate a poet, so that your name may be handed down, like that of Rabirius by Martial, even when your works have perished.

THE LONDON COUNTY COUNCIL.

The last weekly meeting of the present County Council was held on Tuesday, at the County Hall, Spring Gardens, Sir John Hutton, Chairman, presiding.

Schedule of Prices for Jobbing Works.—The following report of the General Purposes Committee was discussed, and the recommendation, after a short discussion, was agreed to:

"The Council on June 19 last resolved that, for the purposes of works coming within the category of jobbing works, a schedule of prices should be agreed upon between the Works Department and the architect and engineer, upon which the estimates, measurements, and certificates of the architect and engineer should be based, and that the schedule should be revised accordingly. A schedule of prices with regard to jobbing works in connexion with buildings has now been prepared by the manager and the architect, and we have had

under consideration the question at what rate per cent. above the schedule of prices the jobbing works should be carried out by the Works Department.

To aid us in the matter we have referred to the published list of the percentages at which the jobbing contracts under the School Board for London are let. These percentages differ considerably. One contract is 17½ per cent. above the schedule prices, and four contracts have been let at the schedule prices. As these minimum and maximum percentages are doubtless due to exceptional circumstances, we think they should not be taken into consideration in settling the Council's schedule. The average of the remaining forty-four contracts under the School Board works out to just over 11 per cent. It must, however, be remembered that for the purposes of these jobbing contracts, the Board Schools have been placed in forty-nine groups, whereas the Council's jobbing works carried out by the Works Department extend over the whole of London. We therefore think that the percentage above the schedule prices for the Council's jobbing works should be slightly higher than the average of the School Board contracts, and that 12½ would be a reasonable percentage. We accordingly recommend—

"That 12½ per cent. be allowed above the schedule of prices for jobbing works in connexion with buildings carried out by the Works Department."

The schedule of prices for engineering works is not yet ready, but we will report later on with regard to it."

Cost of Works executed by the Works Department.—The same Committee also brought up the following report, each of the recommendations being agreed to after various amendments had been negatived:—

"The Council on November 23 last referred it to us to consider and report as to the advisability of framing a Standing Order which would provide for the approval of the Council being obtained to the ascertained cost of works executed by the Works Committee, and the recommendation of the Works Committee, as it had been brought to their notice that the present Standing Order merely required the Committee to report to the Council the cost of each completed work, and did not provide any means whereby the approval of the Council might be expressed to the ascertained expenditure. The Standing Order on the subject is as follows:—

"The Committee shall, on the completion of the works referred to it, forthwith report to the Council that such works are completed, with particulars of the estimated and actual cost thereof." Having carefully considered the matter, we are of opinion that there should be some amendment of the Standing Order to effect the object in view, we recommend—

"That the following be substituted for the Standing Order quoted above—

1. The Committee shall keep separate accounts in such manner as to show the cost of each work executed.

2. The actual cost and final estimate shall as far as practicable be ascertained and certified within three months after the completion of the work.

3. Statements showing the estimated and actual cost of the works executed shall be prepared half yearly, in April and October, and presented to the Council.

4. When there has been an original estimate of cost, and statements shall show (a) the estimate, (b) the amount of the estimate as amended (if at all) by reason of certified additions or deductions, and (c) the amount of the certified actual cost of each work executed.

5. The accounts for jobbing works, which for this purpose are defined to be works in respect of which bills of quantities, complete specifications, and drawings have not been supplied, the statements shall show the total of (a) the amount shown by the measured accounts as priced out in accordance with the schedule of prices, and (b) the certified actual cost.

6. Such statements shall be presented by the Works Committee to the Council in the month of April and October in each year in respect of all works which have been certified as complete, and the final estimate and certified actual cost of which has been ascertained during the preceding half-year.

7. In the case of any work, the actual cost of which has exceeded the original estimate or the amended estimate as the case may be, the Works Committee shall obtain the approval of the Council to the amount of the excess.

8. The actual cost of each work as ascertained and reported shall be charged as expenditure in the books of the Council to the account of the service in connexion with which the work was executed, but a separate account shall be kept, to be called the "Works Department Profit and Loss Account." This account shall be debited from time to time with the amount of the amounts by which the actual cost of works exceeds the original estimate or amended estimate, or amount of the measured account, as the case may be, and shall be credited with sums equal to the amounts by which the actual cost of work is less than the original estimate or amended estimate or amount of the measured account, as the case may be.

9. A statement showing the balance appearing in such account shall be presented to the Council with each half-yearly statement of cost of works."

The Old and the New Building Acts.—On the reception of the report of the Public Health and Housing Committee,

Major Probyn asked whether it was intended to build artisans' dwellings on the Drury-lane site under the old Building Act or the new one.

Mr. Bruce replied that, since the buildings were designed and the foundations put in last year,

before the new Building Act came into force, the work would be carried out under the old Act.

Tribunal of Appeal and the New Building Act.—The Building Act Committee brought up a report containing the following paragraph, the recommendations being agreed to.

"Section 180 of the London Building Act authorises the Tribunal of Appeal to 'appoint such clerks, officers, and servants as they may find necessary, who shall be paid such salaries as shall be determined by the Council, and to provide offices and to obtain such professional advice and assistance as they may find necessary'; and Section 186, after providing that all fees, &c., paid to the tribunal shall be paid over to the Council, states that 'the office and establishment expenses of the tribunal, and expenses incurred by the tribunal and the Council in reference thereto, shall be defrayed out of the county fund.' We have, under these sections, made certain provisional arrangements with the tribunal, subject of course to the Council's approval; and we recommend—

(a) That the Council do approve of the payment of a salary of £250. a year to the person appointed as clerk of the Tribunal of Appeal.

(b) That the Council do approve of the Tribunal of Appeal arranging for office accommodation at the Surveyors' Institute at the rent of 65*l.* per annum, and paying a sum of 5*s.* a week for cleaning the offices."

Purchase of the Water Companies.—The Finance Committee reported recommending— "That the Parliamentary Committee be instructed to take the necessary steps to obtain Parliamentary authority for the period of 100 years being allowed for repayment of the moneys borrowed for the purchase of the water companies' undertakings."

Mr. Benchcroft moved to add the words, "and for providing a supplemental supply."

Mr. H. P. Harris seconded the amendment, but it was negatived, and the recommendation was agreed to.

Before the adjournment of the Council votes of thanks were passed to the Chairman (Sir John Hutton), the Deputy-Chairman (Mr. C. Harrison), the Vice-Chairman (Mr. Dickinson), and the staff of the Council.

The first meeting of the new Council to be elected to-day (Saturday) will be held on the 12th inst.

PROVIDENT INSTITUTION OF BUILDERS' FOREMEN AND CLERKS OF WORKS: ANNUAL DINNER.

THE annual dinner of this Institution took place at the King's Hall, Holborn Restaurant, on the 23rd ult., when Mr. H. H. Bartlett, of the firm of Perry & Co., took the chair, supported, among others, by Mr. H. Hardwicke Langston, Mr. P. B. Strudwick, and Messrs. H. Eyres, Howard Colls, Maton, Joseph Randall, and T. Stirling, jun., the company numbering 362.

The toast of "The Queen, the Prince of Wales, and the Royal Family," having been disposed of, Mr. Joseph Randall briefly proposed the toast of "The Architects, Surveyors, and Engineers," coupled with the names of Mr. H. Hardwicke Langston, who replied for the architects, and Mr. P. B. Strudwick, who responded for the surveyors.

Mr. H. Eyres next gave the toast of "The Builders," coupled with the name of Mr. Howard Colls.

Mr. Howard Colls, in the course of his reply, said that the proper duty of both the clerk of works and the builder's foreman was to see that work was faithfully and properly carried out. It was also the duty of the foreman to see that the master's interests were served, and to see that the men employed did a fair day's work for a fair day's pay. He would not employ a foreman if he thought that his anxiety was to sweat the men; but what was wanted now, and what they asked for, was an intelligent day's work. The Gospel of Idleness was too often preached in these days. It was said that if a man only did half-a-day's work, there was thus work for another man for the rest of the day; but the greatness of England was not brought about in that way. No one could succeed who did not work fairly and do a proper day's work. If work cost more in consequence of the present-day teaching, so much less work was done; and while men who acted in the spirit of this teaching believed they were helping their fellow-men, he thought they were doing the exact opposite.

Mr. J. Beer proposed the toast of "The Governors, Trustees, Donors, Honorary Subscribers, and Visitors," coupled with the name of Mr. T. Stirling, jun., who briefly replied.

The Chairman, in proposing the toast of the evening, "The Provident Institution of Builders' Foremen, and Clerks of Works," said that he was speaking on behalf of an old-established institution, which existed for one object—to help those of its members who were in need. The Institution dealt in no niggardly way with pensioners, for it awarded 12*s.* a week to its members, and 5*s.* a week to widows of members; the children of members being assisted up to the age of fourteen. Every case was thoroughly inquired into, and help was not afforded unless the case was a deserving one. A sum of about 5,000*l.* had been accumulated during the existence of the Institution, but the members wished to keep that sum intact, desiring to pay each year's outgoing by each year's income. The expenditure each year was balanced by income, and the reserve was not touched. The expenses of carrying on the Institution were very small. Omitting printing, rent, postage, and stationery, which were items which did not come into the management of the Institution, the working expenses were no more than 46*l.* 6*s.* in the year. He might mention that there was a library connected with the Institution, consisting of 450 volumes. The library could be enlarged, and if any one had suitable books to spare the Institution would be glad to receive them. No society or non-society regulations were allowed to interfere with the administration of the charity; and wisely so, in his opinion. He might add that human beings could not be forced into one mould. Nature was against it. How could they expect, or force human beings to think in the same way? The only way they could help themselves was for each man to make his own abilities felt and his own energies of value to the world. Those abilities it was a man's duty to use, and endeavour to raise himself to the position of the highest; not sink down to the level of the lowest.

The toast was coupled with the name of Mr. J. W. H. Bedford, who supplemented his remarks by reading the list of subscriptions received during the evening, amounting to 62*l.* 9*s.* 6*d.*, including 10*l.* 10*s.* from the Chairman.

Other toasts were "The Chairman," proposed by Mr. W. H. Sharpington, "The Press," proposed by the chairman and responded to by our representative, and "The officers of the Institution," proposed by Mr. Sharpington, who feelingly referred to the death of Mr. J. Groome, which had occurred since the last dinner.

COMPETITIONS.

INFECTIOUS DISEASES HOSPITAL, CREWE.—We understand that the premiums in this competition have been awarded as follows:—First premium, Mr. Geo. Bolshaw, Southport; second premium, Mr. E. Harding Payne, London. Sixty-three sets of designs were received.

ARCHITECTURAL SOCIETIES.

CARLISLE ARCHITECTURAL, ENGINEERING, AND SURVEYING SOCIETY.—At a meeting of this Society on the 21st ult. Mr. W. Pogson read a paper on "Iron Roofs." After observing that iron, on account of its great durability, comparatively easy manipulation, and great strength in comparison with other materials, relative weights being considered, was preferable to other materials such as stone, brick, timber, &c., for spans of more than about 30 ft., he gave a description of the various forms of iron roofs in use. The form of roof consisting merely of corrugated iron bent round angle-irons and bolted thereto was first dealt with, after which the lecturer proceeded to sketch the construction of those covering spaces of greater width and supporting heavier coverings, finishing up with a description of some local roofs which might be classed among the best examples of modern engineering skill. The dead and live loads were also fully dealt with, the lecturer expressing the opinion that in Great Britain an allowance of from 40 lbs. to 50 lbs. live load per square foot for wind-pressure was amply sufficient, quoting various recorded pressures in support of his views. It was also pointed out that where the roofs were built in a series of separate principals the intermediate trusses need not need anything like such a large allowance for wind-pressure, on account of the protection afforded by the outside trusses. There was no necessity, he contended, to treat snow and wind together as live load, inasmuch as a high wind exerting a pressure of 50 lbs. per square foot would effectually clear the snow away

in a very short time. The paper was illustrated by a large number of diagrams.

LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.—Mr. J. T. Micklethwaite, F.S.A., delivered a lecture to the members of the Leeds and Yorkshire Architectural Society, in their room at the Mechanics' Institute, Leeds, on the 25th ult., on "The Story of the Building of Westminster Abbey Church." Mr. E. T. Dodgshun (the President) occupied the chair. Mr. Micklethwaite remarked that when we had the story of the development of one of our great churches, it threw a good deal of light on other churches. These churches, as we saw them, were not deliberately designed structures, but grew naturally, like a tree out of the ground. Some of our older abbeys, like Ripon and York, go right back to the seventh century, and gradually grew and became the great churches that we saw now, and he wished to show them how that happened at Westminster Abbey. Westminster Abbey was a national monument. It only became that by accident. It happened to be next to the residence of the King, and became the place of the coronation of the Kings, and from the time of Henry III. onwards it was recognised as their place of burial. In the seventeenth century it began to be thought that burial in Westminster Abbey was the greatest honour that could be conferred upon a man after his death. That feeling grew up during the Commonwealth, and all the great men of the Commonwealth were buried there. The first Abbey was erected in the seventh century, but Bede, the great historian of the English Church at the time, did not mention it, though he mentioned York and Ripon, and we might take his silence as proof that in his time Westminster Abbey did not exist. In the eleventh century we get the fact that Edward the Confessor wished to build an Abbey close to his house at Westminster, and there was an old Abbey there. We were not told how old it was, but he set to work to rebuild it. The lecturer then traced the progress of the Abbey buildings, illustrating his remarks by references to plans, and showing how they continued to grow until the sixteenth century, every step being a definite step in the history of the Abbey. At the close of the lecture questions were invited, and a vote of thanks to the lecturer concluded the proceedings.

GLASGOW INSTITUTE OF ARCHITECTS.—A special meeting of the Council of this Institute was held in the chambers of Messrs MacLean, Fyfe & MacLean, on the 25th ult., the President, Mr. T. L. Watson, in the chair. The Secretary, Mr. C. J. MacLean, read the letters which he had received from the Very Rev. Principal Caird, Sir John Stirling Maxwell, Bart., Sir George Reid, P.R.S.A., Sir Frederic Leighton, P.R.A., and Mr. R. Norman Shaw, R.A., intimating their acceptance and appreciation of the honorary membership which had been conferred on them by the Institute.

ENGINEERING SOCIETIES.

THE INSTITUTION OF JUNIOR ENGINEERS.—At a meeting of this Institution, recently held at the Westminster Palace Hotel, Victoria-street, the Chairman, Mr. Henry J. Young, presiding, a paper was read by Mr. Walter J. Fryer, A.I.E.E., on "The Practical Application of Alternating Current Motors." The difficulties of running alternate motors from lighting circuits, especially in England where single-phase currents at high frequency are used, were first indicated, and it was argued that they could be successfully overcome. Describing the several classes of these motors, the author showed that a single-phase motor was one which was energised by simple alternating currents; a two-phase motor, one actuated by two currents differing in phase and traversing the field in two distinct courses. In a three-phase motor the angular effect of the currents usually differed by either 120 deg. or 60 deg., according to the method of winding. Rotary-field multi-phase motors consisted of many poles, the windings of which were so arranged that the resultant magnetic force passed successively through each, causing the poles to travel in a rotary manner. A single-phase Brown motor with the method of winding was then fully described, as was also its application to an installation designed by the author, the supply for which had been taken from the public lighting circuits. The various arrangements for rendering the motor self-starting on load, and for preventing the sudden rush of current, which would cause the pressure at the lamp terminals to drop were illustrated by numerous diagrams.



Illustrations.

MALMESBURY ABBEY.*

THE abbey at Malmesbury, in the extreme north of Wiltshire, formed one of the group of great Benedictine houses in the West, to which Gloucester and Worcester, Pershore and Tewkesbury belonged. Gloucester and Worcester, now cathedral establishments, have already been described in our Cathedral series.† Tewkesbury has also been given in the present series.‡ With the exception of Pershore Abbey, all these churches are fairly complete. Both Pershore and Malmesbury, however, have fared badly. At the former, everything west of the crossing has gone; while at Malmesbury, the nave is the only portion of the church remaining in anything like a complete state.

Mældulph is said to have built a cell at Malmesbury, and afterwards a "basilica."

Aldhelm, a disciple of Mældulph, in the seventh century, generally considered as the founder of the monastery of Malmesbury, appears to have enlarged the basilica of Mældulph, and dedicated it to the Holy Saviour and SS. Peter and Paul. There seem also to have been two other smaller churches, one dedicated to St. Mary and another to St. Michael.

The space at our disposal will not permit a detailed account of the period extending between this and the Norman period, when the abbey church was rebuilt on a grander scale. Aldhelm was transferred to Sherborne, but on his death and canonisation was brought back and buried at Malmesbury Abbey. The monastery received from time to time benefactions and grants of land from the Kings of the West Saxons and of Mercia. King Athelstan not only gave grants of land,

but also presented the abbey with many relics, including the hilt of the sword of Constantine the Great, in which was said to be one of the nails from the Cross. Athelstan dying in 941, was buried before the altar of the abbey, and his two nephews are said also to have been buried by St. Aldhelm in the chapel of St. Michael.

There can be but little doubt that the Norman church occupies the same site as the earlier churches, though its walls would not necessarily coincide with the earlier buildings. The design of the present church is sometimes attributed to Bishop Roger of Salisbury (1107-1139), but its architecture would place it rather later in the century, and William of Malmesbury, although alive at the time, makes no mention of it. From the scanty remains of the presbytery we may conclude that the entire church was rebuilt at this period, and it must have been, when complete, one of the most imposing buildings of its kind in England. The impressive effect was much enhanced, as in the cases of Tynemouth, Whitby, and Durham, by its position—in this case an elevated plateau, with sides sloping steeply to the Avon. The monastery was so arranged that the monastic buildings, which were on the north side of the church, came almost to the edge of the plateau. The chief approach was from the south, and on this side the town was built; and in the south-west corner of the churchyard was the Church of St. Paul, now, with the exception of the tower and spire, used as a belfry for the abbey, completely destroyed.

The ground plan of the church was an interesting one, although in its main features it no doubt followed the usual Benedictine arrangement. It consisted of a nave of nine bays with aisles and a large south porch, a central tower crowned with a lofty spire, transepts projecting two bays clear of the nave aisles, and a presbytery and chapel of St. Mary. William of Worcester describes the length of this chapel of St. Mary as thirty-six "gressus," and its breadth nine "gressus." He also gives the projection of the transepts beyond the aisle as twenty-two

"gressus." The west wall of the south transept being fairly complete to its south-west angle, we are enabled to pretty accurately determine the other main dimensions of the church. The interior face of this south transept is 39 ft. beyond the aisle. Applying this to the other dimensions given by William of Worcester, would give the total length of the church as about 305 ft., and the length and breadth of the chapel of St. Mary "at the east," as 64 ft. and 16 ft. respectively. It has been suggested that this eastern chapel was placed across the east end as at Abbey Dore, Byland, and Durham, but it seems most probable that, like Tewkesbury, and Gloucester, and St. Alban's, it projected eastward of the presbytery. The chapel was, from its dimensions, evidently four bays in length.

The interior length of the nave is 150 ft., and the tower was about 40 ft. square, leaving about 110 ft. for the length of the presbytery east of the crossing. The distance from centre to centre of the nave columns is 16 ft., and presuming that the bays of the presbytery were of the same width, would give seven bays, that is a presbytery of six bays with an eastern ambulatory or aisle. Although the late Professor Freeman, in an article on the architecture of the abbey, thought it probable that the presbytery was a short Norman one of three or four bays, it would seem, taking the dimensions above quoted, that it was of greater length, and the importance of the abbey, and the number of tombs and shrines which it contained, would not make this length excessive or unusual.

One of the bays at the east end might well be taken up by the shrine of St. Aldhelm, which would thus have five bays for the presbytery between the crossing and the altar-screen.

The ritual choir, as may be seen by the inner faces of the tower piers, was under the crossing, and perhaps projected one bay into the nave, where it was screened off from the rest of the nave by the rood-screen.

This rood-screen remains, but is now placed between the piers under the western arch of the crossing, and forms the reredos behind the present parish altar. It has a central door, and is finished with an embattled cornice and paterne. The plinth is almost entirely covered by the modern steps of the altar, but there are no traces of any altars flanking the doorway, although there may very possibly have been originally one on each side. The screen is of the fifteenth century. The transepts were of two bays beyond the aisles. They had no western aisles, but probably eastern chapels. The central tower was perhaps a lantern—afterwards closed by the insertion of Perpendicular vaulting—and was crowned with a lofty "pyramis," or spire, that is said to have rivalled that of Salisbury Cathedral in height.

Another feature of the building when complete was a large square tower at the west end, not projecting beyond the Norman front, but rising over the two western bays of the nave. Malmesbury was thus similar to Hereford when complete in having western and central towers. The ruin of much of the fabric is to be attributed to the fall of these towers. The central tower seems to have been in a dangerous condition for some period, and in falling doubtless ruined the presbytery. Likewise the western tower carried away the western bays of the nave on which it was built, and from the utter ruin of the north side of the church at this point, would seem in its fall to have inclined in that direction. These calamities must be taken into consideration in dealing with the state of the building at the time of the dissolution of the monasteries. It is by no means improbable that the western tower had been built to contain the bells when the central tower gave signs of falling, and that on the destruction of the presbytery the services were held in the nave. This perhaps would explain William of Worcester's reference, on his visit temp. Henry VI., to "the ruins of a rare demolish'd Church," and to "her Great High Tower, at the upper end of the High Altar much decay'd and ruined." Leland also says, "It had two steeples. One had a mighty high pyramis, and fell dangerously *longum memoria*; it stood in the middle of the transeptum of the church, and was a mark to all the country round. The other yet standeth, a great square tower at the west end of the church." This was in 1540.

At the Dissolution, the abbey buildings were purchased from the king by William Stumpe, Esq., for fifteen hundred pounds. Stumpe presented the church to the town of Malmesbury as a parish church, and doubtless some of the enclosing walls are of this date. More recent

* The series of the "Abbeys of Great Britain" is continued this month with illustrations of "Malmesbury." Particulars of this and of the three Cathedral series ("England and Wales," "Scotland," and "Ireland") will be found on p. xx.; also (on page 1.) of the recent re-issue, in book form, of the series of English and Welsh Cathedrals.

† See *Builder* for December 3, 1891, and August 6, 1892.

‡ See *Builder* for December 1, 1894.

* Bird's "History of Malmesbury," p. 67.

* Other examples are at Jily and Winborne: at Christ Church, Hants, only the west tower remains.

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THE ABBEYS OF GREAY

DRAWN BY MR

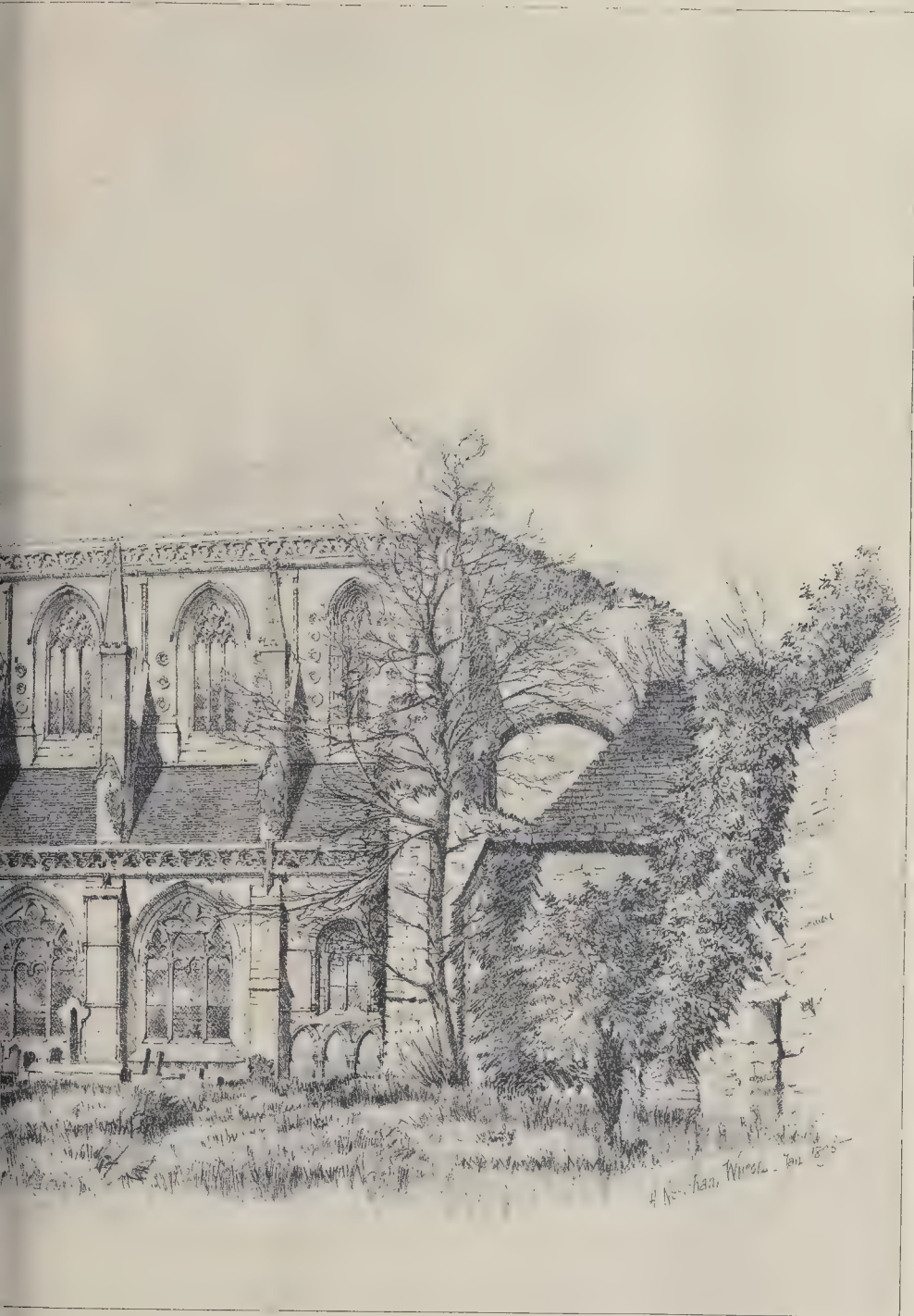
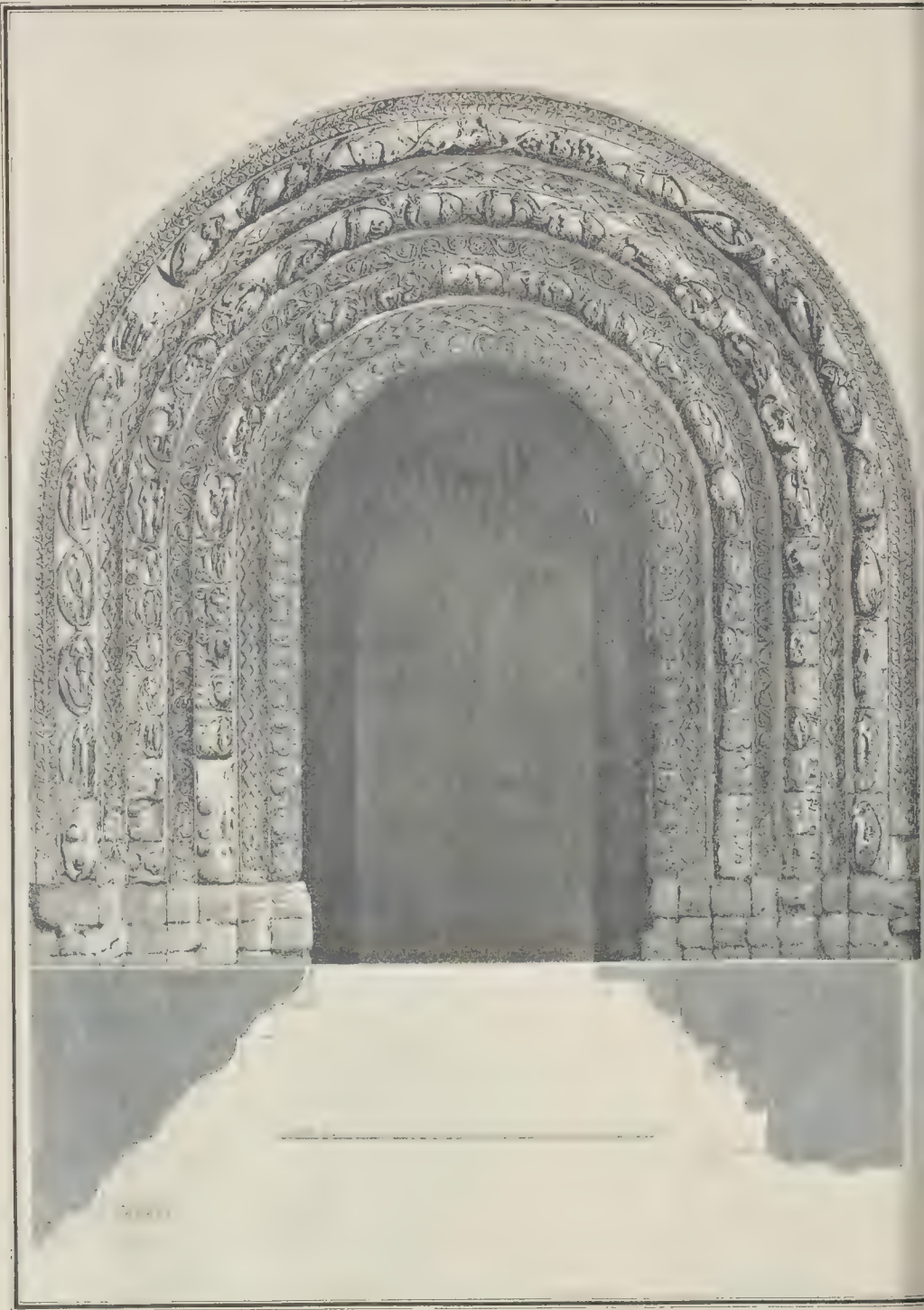
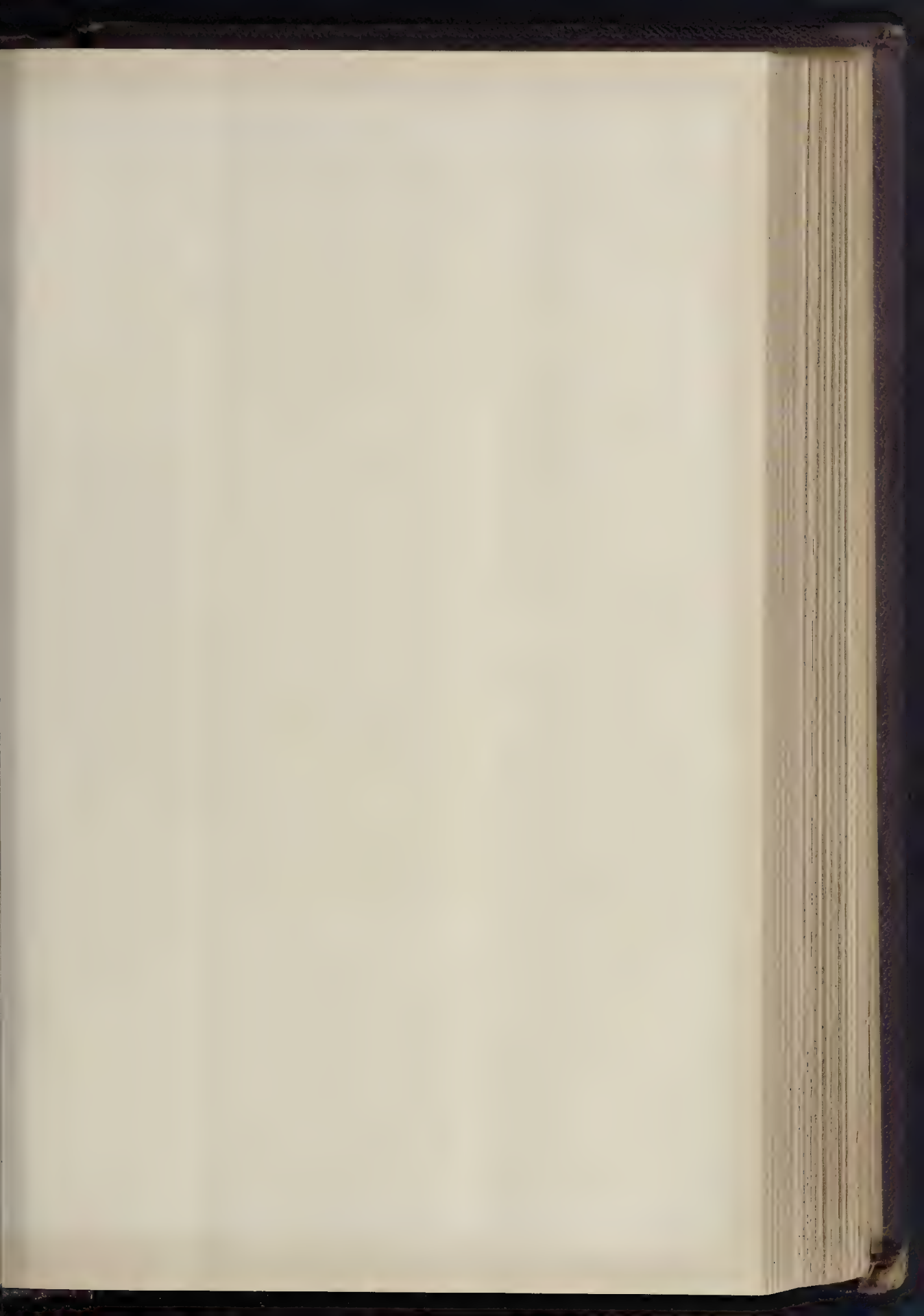


PHOTO SHAW, L. & CO. 187 EAST HARDY STREET, FETTER LANE, E.

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A. A. RIBA

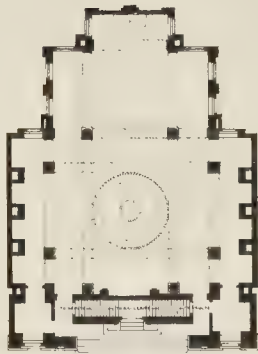


SOUTH PORCH, MALMESBURY ABBEY.—FROM AN ENGRAVING BY LE KEUX



: HANOVER CHAPEL: REGENT STREET:

Drawn by Mr Geo J.J. Lacey.

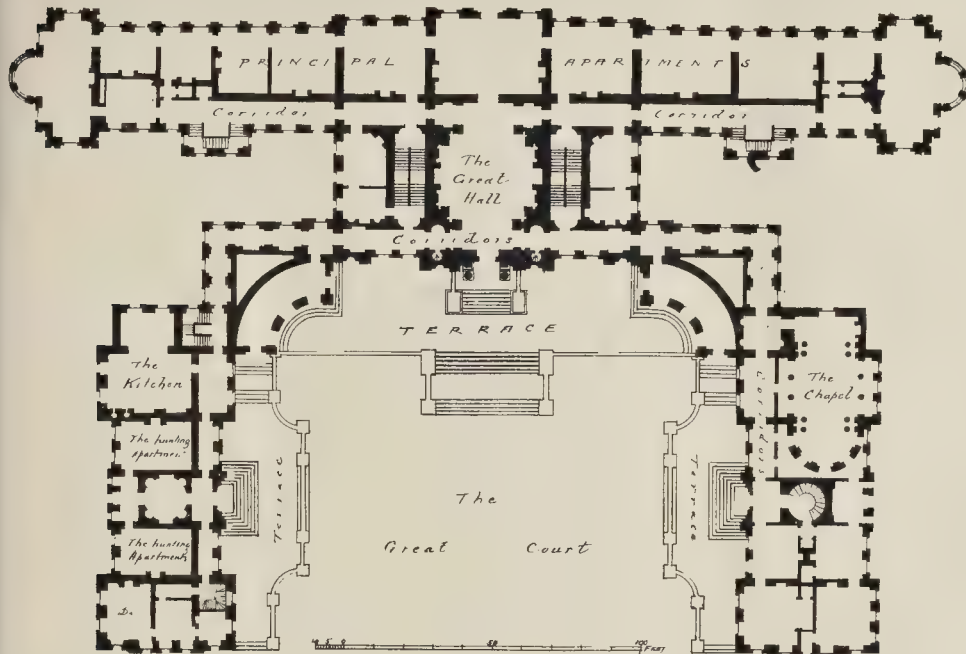


PLAN
SCALE 1/4" = 1' 0"



PHOTOGRAPH BY MR. J. J. LACEY, EAST HANOVER STREET, LONDON.

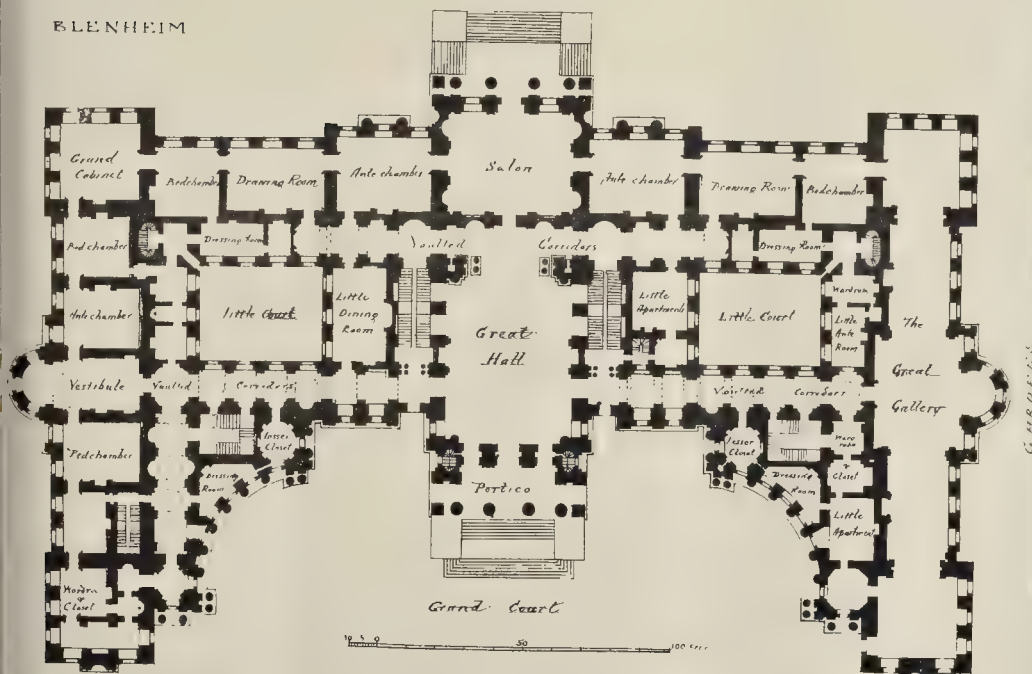
CASTLE HOWARD YORKS



C. RITCHISON, H.R.A.

GARDENS

BLENHEIM



C. RITCHISON, H.R.A.

PHOTO. 1/100 SPRAUE & CO. 4 & 6, EAST HARDING STREET, FETTER LANE, E.C.

PLANS OF CASTLE HOWARD AND BLENHEIM

(Published as Illustrations to Professor Atchison's Lectures.)

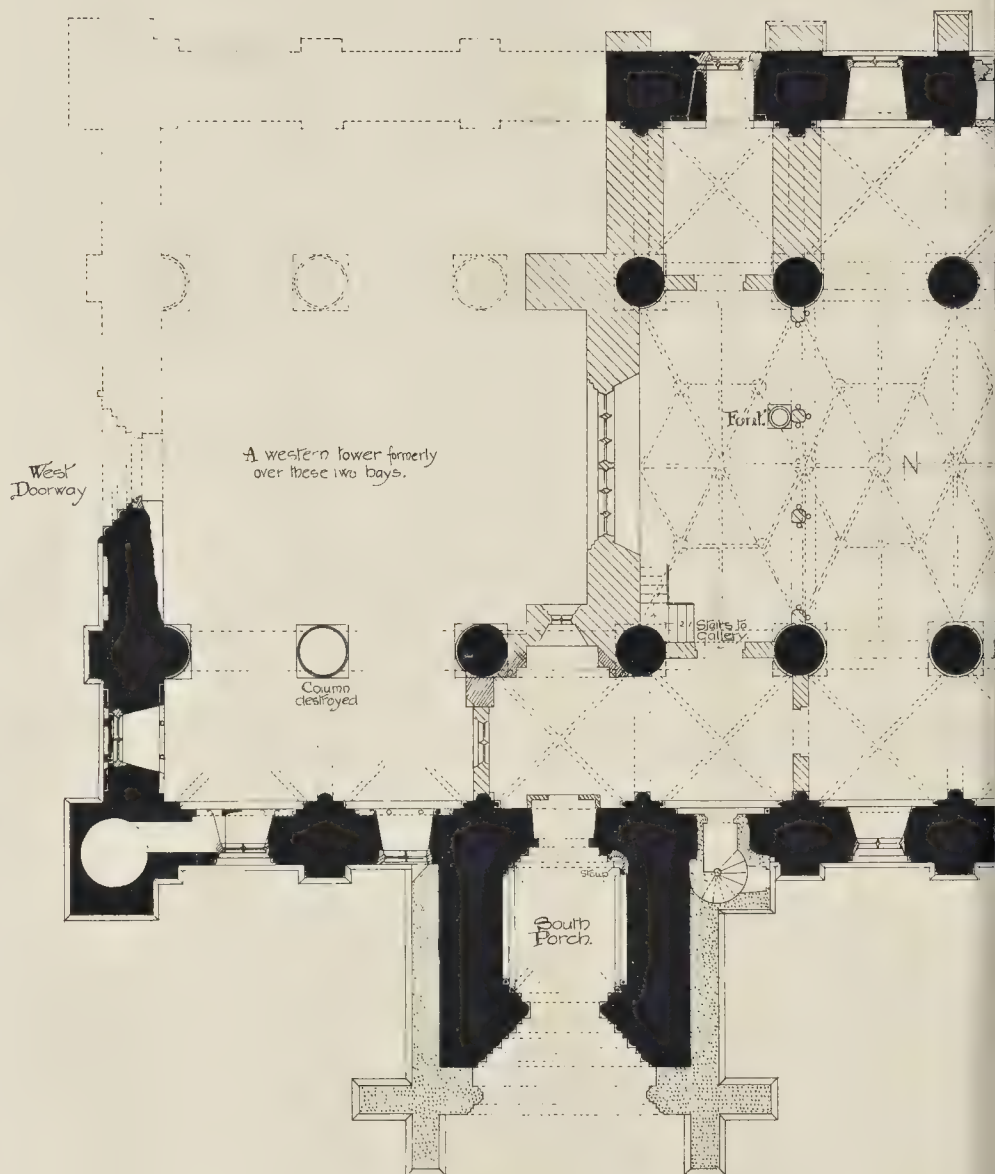


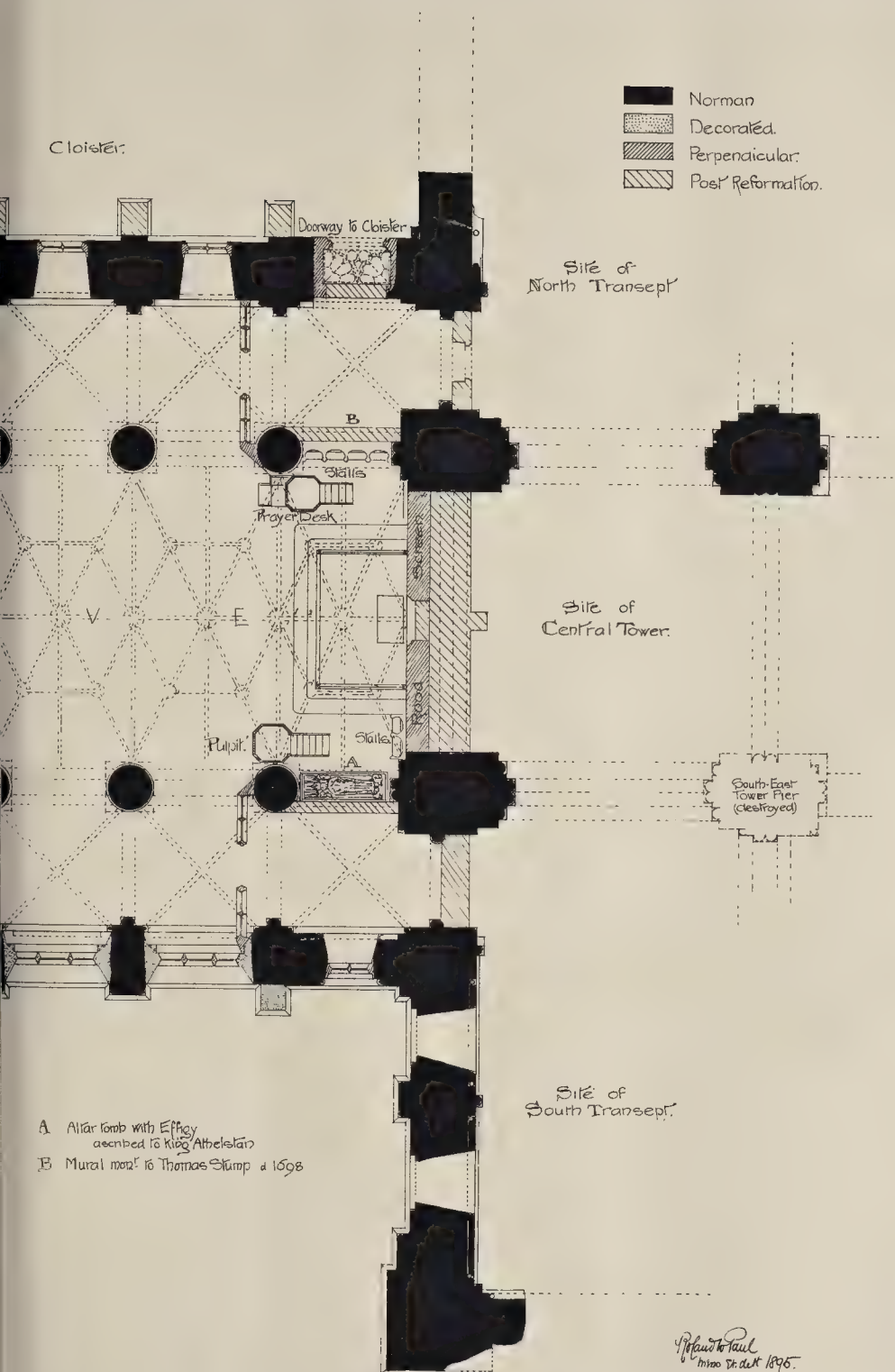
PART OF INTERIOR, MALMESBURY ABBEY. -DRAWN BY MR A NEEDHAM WILSON, A.R.I.B.A

MALMESBURY ABBEY CHVRCH.

GROUND-PLAN.

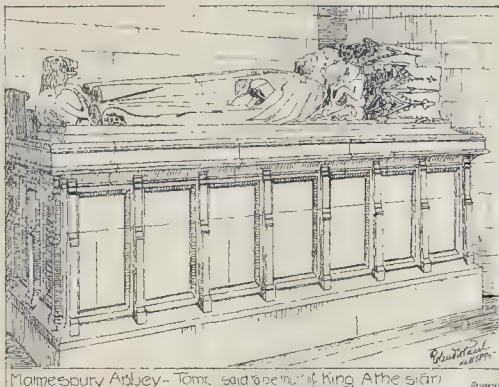
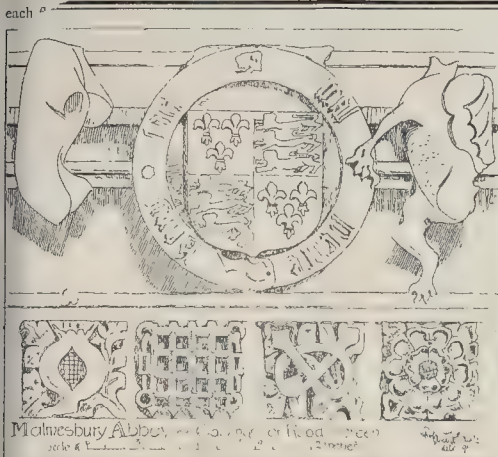
Site





MARCH 2, .

great



alterations and additions were carried out in 1822. The portion now used consists of the first six bays of the nave west of the crossing. A gallery crosses the west bay, and the seventh bay of the south aisle has been enclosed, and forms an inner lobby to the south porch.

As will be seen on referring to the ground plan, the whole of the main walls are Norman—everything, in fact, to the clearstory level, with the exception of some minor details, windows, &c.

The western front had a central doorway with sculptures of the signs of the Zodiac, and the whole front was arcaded, divided into four stories horizontally. At each angle was a large stair-turret, oblong on plan. There was a large west window, a Perpendicular insertion, however, and over this rose the great west tower. The nave itself of nine bays has an arcade with pointed arches resting on cylindrical columns 5 ft. in diameter. Above is a triforium with an arcade of four arches enclosed in a large semi-circular arch. Over this is a clearstory—Decorated—pierced with windows of three lights, one in each bay, and vaulting springing from wall shafts carried up from the caps of the great columns. The lofty proportions of the triforium and clearstory—for there is evidence on the exterior that the clearstory was not raised when altered in Decorated times—is a special feature in the interior, and is a much more satisfactory design than the arrangement in the naves of Gloucester and Tewkesbury, where these features have been reduced in size on account of the great height given to the nave columns. The aisles were lighted by single round-headed windows, and many of these remain.

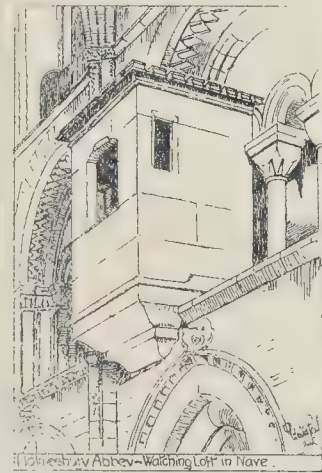
The great south porch, with its elaborate sculpture, is alluded to and illustrated elsewhere in the present number. It was intended to be vaulted, but the work does not seem to have been completed.

Nothing seems to have been done—at all events to the nave—in the thirteenth century; but in the fourteenth the desire doubtless for more light induced the monks to rebuild the clearstory, not only of the nave, but to judge by traces in the walls, of the transepts also, and perhaps of the presbytery. We know that at Tewkesbury the presbytery had undergone a like change, and at Gloucester it was practically remodelled in Perpendicular times. In two bays of the south aisle, and in one of the north aisle of the nave, large decorated windows were introduced, of rather curious design (one of these shows in the sketch of the interior). That on the north, owing to the cloister necessitating its being raised, was finished with a gable and vaulted. This forms a curious feature on the exterior, and is similar in treatment to a window in the corresponding position at the Priory Church of Brecon. At Shrewsbury the aisle windows were gabled, and also at Chichester. The picturesque and unusual treatment of the clearstory windows at Tewkesbury was illustrated in our account of the abbey in the *Builder*, December 1, 1894. During this period the great south porch was encased, and buttresses added, and the walls of the porch and of the aisles and clearstory were finished with pierced parapets. The introduction of vaulting also necessitated pinnacles and flying buttresses, which were added on both sides of the nave. Of the central tower, three of the

piers remain. The south-east pier has been destroyed. Only the west and north arches are standing, with the springing of the later vaulting above. The north-east pier, on its north and east faces respectively, shows portions of the transept and presbytery, both of which appear to have followed pretty closely the general design of the nave.

The west wall of the south transept remains, including a portion of a large turret at the south-west corner. It was, like the nave, arcaded both inside and outside below the windows.

There are some points of interest that claim attention in the interior. Projecting from the triforium at the fourth bay, west of the crossing on the south side, is a Late Perpendicular



watching-loft, with openings in the front and at the sides. Its exact purpose cannot be determined, but it was most probably placed for watching some shrine or altar near the rood-screen on the north side of the church. The rood-screen itself is of stone, 11 ft. 6 in. in height, and also of Late Perpendicular date. It is of interest to compare with the screen left in a similar position at Croylund Abbey (see *Builder*, September 1, 1894). That at Malmesbury was apparently simply a screen for the choir-stalls to return against, whereas that at Croylund was like St. Cuthbert's screen at St. Albans Abbey, a rearedos with an altar in the centre, and a doorway on either side. The cornice of the Malmesbury rood-screen is ornamented with various paterae—griffins, a portcullis, a Tudor rose, a harp (? for St. Aldhelm), a pomegranate, a knot, and various other badges and devices. In the centre are the arms of King Henry VII., with France quarterly with England, surrounded by a garter, and with supporters, a dragon and a (?) greyhound (the latter much mutilated).

There are two side-screens across the aisles at the first column west of the crossing, with pierced tracery and doorways in the centre. (See sketch of interior.)

Of the numerous monuments this abbey must have contained only one remains—placed at present under the arch south of the present altar—consisting of an effigy, crowned, resting on a late altar-tomb. The sides are panelled, with small buttresses between each panel. The trunk of the effigy and the body of the lion on which the feet rest are original. The heads of both effigy and lion, however, are later additions, and of poor workmanship. Over the head is a rich canopy, and on each side of the pillow an angel. It is generally known as the tomb of King Athelstan.



In the vestry, now north of the altar, are some encaustic tiles, dug up on the site of the church east of the tower. Two are armorial, one bearing the arms of the Despencers, and another with the fragments of two lions, apparently part of a large tile. There are some foliage patterns of good design and some plain border tiles, yellow and black. Here are also two bosses, one with the Five Wounds, another with a representation of the Annunciation.

There are some interesting traces in the third bay from the west on the south side, of the filling up and buttressing, which was rendered necessary by the erection of the western tower. An arch was built within the Norman one, and the column was buttressed on its south side. Above in the clearstory the extra flying buttress is still standing.

Of the monastic buildings immediately attached to the church nothing remains; but the doorway at the north-east angle of the nave, which led to the cloister, is an interesting feature. The original Norman arch has had a later doorway inserted, and Perpendicular vaulting placed in the thickness of the wall. This doorway and vaulting should be compared with the doorway at Tewkesbury. A portion of the springing of the vaulting of the cloister remains in the angle, and shows it to have been of Perpendicular date.

At a little distance north-east of the abbey is an Elizabethan house, standing on an earlier crypt or basement; this is probably the lower portion of the Farmery (or Infirmary) Hall, and was placed quite at the edge of the hill overlooking the Avon.

Nothing remains of the gateway to the abbey precincts. The entrance gateway to the churchyard on the south side near the market cross is a comparatively modern building, probably of the seventeenth century. The market cross itself is a well-known example, resembling Chichester and Salisbury.

E. W. P.

THE SOUTH PORCH.

We give a separate illustration of this, reproduced from an admirable and not very generally attainable engraving by Le Keux.

An anonymous tourist visited Malmesbury in 1634, and in his "Topographical Excursion," printed in "Brayley's Graphic and Historical Illustrator," p. 411, has preserved a minute account of the sculptures of the southern porch.

After a general description of the edifice, he says: "At the South side of this ancient flabrick at the entrance of a fayre Porch, there is curiously cut, and carv'd in freestone in 3 oval arches, Statues representing the Creation, the Deluge, & the Nativity, w^{ch} in their artificial Postures, I may compare to wells, though not in number so many, nor in lignes so great. And w^{ch} in the same Porch on either side are equally plac'd the 12 Apostles, & right over the Doore entering into the Church, is Christ on His Throne between 2 Cherubims, w^{ch} are most artificially cut, and carv'd.

On the first arch.—1. Defac'd quite. 2. Light from Chaos. 3. The Sea from the Land. 4. The Lord sits & beholds. 5. Hee makes fowles. 6. Hee makes fish. 7. Hee makes the Beasts. 8. The Spirit moving upon ye water. 9. Adam made. 10. Adam sleeps & woman made. 11. Paradise. 12. Adam left there. 13. Divell tempts Eve. 14. They hide themselves. 15. God calls to them. 16. God thrusts them out. 17. A Spade & Distaffe given. 18. Adam digs, Eve spins. 19. Eve brings forth Cain. 20. Abell tills ye Earth. 21. 22. Two Angels for keepers. 23. Abell walks in ye field. 24. Cain meets him. 25. Cain kills Abell. 26, 27, 28. Demolish'd quite.

On the second arch.—1. 2. God sits and beholds the Sins of the World. 3. Cain a fugitive. 4. He comes to Eve. 5. An Angell. 6. God delivers Noah ye Axe. 7. Noah works in the Arke. 8. Eight Persons saved. 9. Abraham offers Isaac. 10. The Lamb caught in ye Bush. 11. Moses talks wth his father. 12. Moses keeping Sheep. 13. Moses and Aron strikes ye Rocke. 14. Moses reads ye Law to ye Elders. 15. Sampson tearing the Lion. 16. Sampson hearing ye City Gates. 17. The Philistins put out his eyes. 18. David rescues the Lamb. 19. David fights wth Goliath. 20. Goliath slaine. 21. An Angell. 22. David rests himself. 23. Defac'd quite. 24. David walks to Bethoron. 25. David's entertainm^t there. 26, 27. Demolish'd quite.

On the third arch.—1. 2. Defac'd quite. 3. John ye forrunner of Christ. 4. Michael the Archangell. 5. The Angells comes to Mary. 6. Mary in Childbed. 7. The 3 Wisemen comes to Christ. 8. They find him. 9. Joseph Mary & Child goes into Egypt. 10. Christ curses ye fig-tree. 11. Hee rides on an Asse to Jerusalem. 12. Hee eats the Passover with his twelve Apostles. 13. Hee is nay'd to the Crosse. 14. Laid in the Tombe by Joseph. 15. Hee riseth againe. 16. Hee ascendeth into Heaven. 17. The Holy Ghost descending on the Apostles. 18. Michael overthrowes ye devil. 19. Mary mourning for Jesus. 20, 21, 22, 23. Demolish'd quite."

These sculptures have been fully dealt with by Professor Cockerell in his work on the sculptures of Wells Cathedral.

Mr. C. H. Talbot, writing in the *Wills Archaeological Magazine*, Vol. XXI., says, "It is evident, at a glance, that the (sculptures of the twelve Apostles) are earlier than the rich carvings of the great arch of entrance. The fact is that the latter have been cut out of the original plain mouldings of the arch, and in the west doorway of the nave some of the mouldings were so treated and some remained plain. A. N. W.

INTERIOR VIEW.

This view of the portion of the interior of the abbey which is still in use as a church is from a drawing kindly placed at our disposal as an additional illustration, by Mr. A. Needham Wilson, who made the special drawing of the exterior for the serial set of illustrations of Abbeys.

HANOVER CHAPEL, REGENT-STREET.

We have pleasure in giving a reproduction of the perspective of the front of this church, which gained for its author, Mr. G. J. J. Lacy,* the silver medal for a perspective drawing of a building, in the last Royal Academy Students' competition, and which has what we may call a melancholy interest in another respect, inasmuch as it is a representation of the only thing in

* Not "Lacey," as given in error on the plate.

Regent-street which can be called architecture, which was the design of an eminent architect, the late Professor Cockerell, and which is probably before long to be demolished.

The first stone of this church was laid on June 6, 1823, and it was completed, at a cost of 16,180*l.*, in June, 1825. A private Bill for its removal was read for the third time on July 30, 1891, it being arranged, we understand, that the site should be purchased by the Commissioners of Woods and Forests. In November last was laid the foundation-stone of the church that is to take its place—St. Aseneth's, Davies-street.

The exterior, with its Ionic order, is no doubt, from the point of view of the present day, somewhat Academic, though it is a refined and scholarly design of its type. The interior is in some respects more interesting than the exterior; it is admirably designed for congregational worship, and the glass dome has an excellent effect internally.

That a church such as this should be deliberately pulled down, although another has to be erected in the neighbourhood to take its place, from sheer greed for a site which has a high commercial value, is one of the unpleasant signs of the spirit of the day in modern England, where money considerations seem more and more to take precedence of all others.

PLANS OF BLENHEIM AND CASTLE HOWARD.

The plans of these well-known mansions, both by Vanbrugh, are given as illustrations to Professor Aitchison's fifth Royal Academy lecture, printed on another page, and are referred to there.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS: FEVER HOSPITALS.

THE ordinary meeting of the Royal Institute of British Architects was held on Monday last, at 9, Conduit-street, Mr. F. C. Penrose, M.A. (President), in the chair.

The decease of three members was announced—viz., Mr. Arthur Lett, Fellow; Mr. Thomas Edward Bridgen (Manchester), Fellow; and Mr. Ewan Christian, Fellow and past President. Mr. Christian's funeral had taken place that day, and was attended, on behalf of the Institute, by the President, the ex-President, Mr. Macvicar Anderson, and Mr. James Brooke, Mr. Graham, Mr. Aston Webb, Mr. Ingelow, and others.

The President said the members must have all received with the greatest regret the announcement of the death of their excellent friend and former President, Mr. Ewan Christian. His work was so well known that it was unnecessary to dilate upon it, and he would simply propose that the condolences of the Institute should be sent to Mr. Christian's widow and children. This was unanimously agreed to.

Mr. T. W. Aldwinckle then read a paper on "Fever Hospitals."

Mr. Aldwinckle said that much of what he had written as to the requirements of fever hospitals would apply to hospitals of all kinds, being general principles of sanitation; and that the paper had been written rather in the spirit of inquiry than of dogmatism. The general awakening of the public mind to the importance of the isolation of persons suffering from infectious diseases was quite recent, as evidenced by the fact that thirty years ago there was in this country no organised system of infectious hospitals, and that London at that time possessed only two—viz., the London Fever Hospital at Liverpool-road, Islington, and the Small-pox Hospital at Highgate, both institutions being entirely supported by voluntary subscriptions. Some of the general hospitals received fever patients under conditions of very imperfect isolation; falling which, infectious cases were sent to the workhouse, with results which could be easily imagined. One great cause of the increased use of fever hospitals had been the passing of the Infectious Diseases (Notification) Act, 1889. This Act provided

(a) That the head of the family or the nearest relative of the patient resident in the building must give immediate notice (in case of infectious disease) to the Medical Officer of Health.

(b) That the medical practitioner attending on the patient, on finding a case of infectious disease, must notify to the Medical Officer of Health for the district the name of the patient, the situation of the house, and the infectious disease from which the patient is suffering.

The site of an infectious hospital should be, if possible, just outside the town or village for which it is intended. The question of transport

of the patient could not outweigh the great advantages to be derived from the hospital having open fields as its surroundings.

Good ambulance arrangements would overcome all difficulties as to transport. There should be two entrances to the hospital, one the "infected entrance" and one the "non-infected entrance," both controlled from the same porter's lodge. A wide roadway should run round the whole of the site, as a neutral zone to separate the hospital from the surrounding property. The axes of the ward pavilions should be as nearly as possible north-east and south-west, in order to provide for the maximum quantity of sunlight and the minimum of shade. This was of the utmost importance, and should be carefully borne in mind in the selection of a site. The ward pavilions should not, where practicable, be of more than one story in height. This might necessitate the purchase of a larger site than otherwise, but the compensating advantages were many. The whole of the several buildings of an infectious hospital should be completely isolated, and stand perfectly free, without communicating corridors or covered ways of any kind. The ward pavilions for diphtheria or enteric fever should be separated at as great a distance as possible from those for scarlet fever. The isolation wards should be well separated from the remainder of the hospital. The official department and the kitchen and stores should be centrally situated, and the stores should be as near as possible to the "non-infected entrance." The staff quarters should be quite free from, and unsurrounded by, the ward pavilions or other infected buildings. The three classes of the subordinate staff in a large hospital—viz. nurse, female servants, and male servants—should have separate and distinct homes, each home being under the *resident control* of the principal officer responsible for its discipline. The laundry should be as free as possible from the hospital proper, and from the staff quarters. No infected building should be nearer than 40 ft. to the boundary, nor to any other building, infected or otherwise, in the hospital. As to the maximum number of beds for which an infectious hospital should be built, the requirements of large towns necessitated the provision of a large number of beds; but it was an open question whether the aggregation of a large number of acute infectious cases upon one site was desirable, and whether it would not be a preferable course to arrange hospitals for a smaller number of beds, and to increase the number of such hospitals in order to provide for the total number of beds required. After going through some plans illustrating various arrangements and systems of planning, the author returned to the general consideration of the various portions of a hospital; from this portion of a very long and most valuable paper we can only extract a few leading remarks. There should be two receiving wards, one for scarlet fever and one for diphtheria and enteric fever, which should not adjoin, but should be as near as possible to the wards of their respective diseases. Each receiving block should contain a good-sized and well-lighted receiving and examination room, with a bath-room adjoining (the doorways to these rooms being wide), together with a room for the ambulance nurses, to which should be attached in each case a warmed store for blankets and gowns. The necessity for a careful examination of the patient in a properly appointed receiving ward was fully recognised in this country, if only as a safeguard against error of diagnosis on the part of the certifying practitioner. There would be, generally, two main groups of ward pavilions in an average-sized fever hospital—viz., one group for scarlet fever and another group for diphtheria and enteric fever. The first important question to be decided in connexion with the ward pavilion was whether there should be one main ward to include convalescing cases as well as acute cases, or whether there should be two separate wards for the two classes. It was undoubtedly an advantage for the convalescing patient to be removed from the disturbing surroundings of an acute ward as soon as possible; but it must be borne in mind that the multiplication of wards increased the number of ward adjuncts and the duties of nursing. It was also difficult, when the ward pavilion was subdivided, to find a suitable position for a properly lighted and ventilated separation ward. The ward pavilion would comprise the following upon

* All our readers may not understand that the reason why only give short *résumés* of the Institute papers, while we generally print those of the Architectural Association, is, that the Institute retains the copyright of its papers, and we are requested not to print them except in the form of a condensed report of their main substance.

each floor:—The main ward and the separation ward; the duty room; the water-closets and sinks; the bath-room and lavatory; the linen-store; the larder; the nurses' water-closet, lavatory, and robing-room. If there were two stories, the staircase leading to the upper floor should be completely isolated from the lower ward and its appurtenances. The maximum number of beds to a ward should be twenty for scarlet fever, and twelve for diphtheria and enteric fever. There were three items to be arranged in connexion with the cubic space—viz., the linear wall-space per bed, the floor-space per bed, and the height of the ward. There was now a general consensus of opinion against very lofty wards. In fact, a height of 12 ft. would be sufficient were it not that with that height a long ward would present a somewhat dwarfed appearance, and we might consider 13 ft. as the most suitable height. The width of the ward should be 28 ft. at the least. The windows (which should be double-glazed to prevent loss of heat) should have an area of not less than 1 ft. for every 70 cubic ft. of ward-space. All internal angles should be rounded. The walls and ceilings of the wards should be finished with Keene's cement, and this, after an interval, should be painted and varnished. A ward thus finished internally could be easily and frequently cleansed, without repainting. The floor of a ward was a subject upon which there was much difference of opinion. Teak was undoubtedly by far the best of all wood floors, being hard, durable, and unaffected by moisture, but it was dark and dull in appearance, and detracted from the cheerfulness of the ward. Terrazzo floor was the most suitable for infectious hospitals. The furniture of a ward should be of a character not likely to harbour infection. The most suitable materials were iron and glass, the use of wood being avoided as far as practicable. It was a convenient arrangement for the water-closets and slop and scalding sinks to be placed together in a turret separated from the ward by an intervening lobby having windows on opposite sides. This lobby should be large enough for convenience of access, but not so large as to admit of ward chattels or refuse being placed there. This turret was placed in various positions by architects, some placing it at the end of the ward; but for convenience of administration he preferred to place it on the east side of the ward, about midway in the length of the ward. In this central position it was more easily reached by both patients and nurses. Two sinks were required in this turret: a slop sink and a scalding sink. A very excellent slop-sink has been designed by Professor McHardy and patented by Messrs. Dent & Hellyer. This sink not only served the ordinary purposes of a slop-sink, but it was formed and fitted to enable bed-pans and urine-bottles to be easily washed and cleansed therein, without manual cleansing and unnecessary handling of the utensils. With a view to reducing the cost, and also of carrying out the "bracket" principle throughout, Messrs. Dent & Hellyer had, at his suggestion, quite recently produced another sink, to be much less costly, and for use where a separate scalding sink for cleansing urine vessels and other articles was provided. (Illustrations of these two sinks were given.) The other sink required in the turret, to be called the "scalding sink," should also be of strong glazed fireclay, and be about 3 ft. long, 2 ft. wide, and from 10 in. to 12 in. deep, and should be fitted with metal rack, for the purpose of cleansing urine-bottles. There should also be in this turret a cupboard open at the back to outer air, for chamber utensils kept for examination. After describing the requirements in some other portions of the hospital, the author turned to the subject of warming and ventilation, which must be considered together as one operation. This subject must also be dealt with in close relation to climate. Ours was a temperate climate, and free from those extremes of temperature which existed in, say, Germany and the United States. He mentioned these two countries because they possessed some very complete systems of warming and ventilation, suitable doubtless to their own climates, but the application of which to our own surroundings would not necessarily be successful. The key to the whole position here was that for at least 300, if not 330, days in the year it was possible for us to open the windows of a hospital ward without danger or discomfort to the patient; and we must keep this fact prominently in view when dealing with the question of ventilation. (It was essential that the wards and their adjuncts (except, of course, the larder) should all be kept very much at the same temperature, in order to avoid draughts being caused by the opening of

doors. As to the nature of the heating apparatus to be used, his own experience was most strongly in favour of low-pressure water apparatus, the water circulating from a steam-heater placed in the basement of each ward pavilion. The wards, then, should be warmed (a) by open ventilating fire-places, and (b) by the diffusion of fresh external air, warmed by passing over hot-water heating surfaces in the wards. Objections were urged against open fireplaces on the ground that it was a wasteful means of producing heat; but this drawback was more than compensated for by the cheerfulness of the open fire, and by the very important fact, too frequently overlooked, that an open fireplace, with a fairly good draught in the chimney, was about the best exhaust ventilator that could be found, and one that acted near the floor level. The warming by open fireplaces should be supplemented by the admission of warmed external air at the sides of the ward. The external air was admitted through glazed channels in the external walls (by preference under the windows), passed over heated copper radiators, through a cast-iron case with movable front, and thus entered the ward. The inlet both of cold and warm air should be capable of regulation. These inlets should be further supplemented by galvanised-iron hit-and-miss or valvular gratings placed in the external walls at the floor level at the back of each bed. No attempt need to be made to warm the air passing through these inlets. The main inlet of external air would, however, be by means of the ward windows. The ceiling of the ward should be flat, without beams projecting below. The windows should run close up to the ceiling line, and the upper portion (about one-quarter of the full window height) should consist of a hopper-hung sash, the hopper sashes being glazed and fitted close up to the ceiling. There should be means of regulating the width to which this sash will open. If these windows were thus opened on both sides of the wards, those on one side would act as inlets, and the opposite ones as outlets, in normal conditions of the wind. The exhaust ventilation already described—viz., that by open fireplaces and open windows could, with advantage, be supplemented by vertical shafts, carried up well above the roof-ridge, and covered with some kind of terminal to prevent down-draught. These shafts should be of brick, glazed internally and with rounded internal angles, and a good upward current could be created by the insertion of a coil of steam or hot water. These shafts should each have two valvular openings leading from the ward—one at the ceiling line and one at the floor level—and these should be so adjusted in relation to each other that when one was open the other was closed. These ventilating shafts would be of considerable value when it is not possible to open the windows. The warming apparatus should be capable of maintaining in the coldest weather a temperature of 60 degs. Fahr. in the scarlet-fever wards, and 65 degs. Fahr. in the diphtheria and enteric wards. In Germany and America a somewhat higher temperature was usually maintained. It was important that the apparatus should be so arranged that it could be regulated and controlled from within the ward.

(The author then proceeded to consider the subjects of sterilisation of air, airing courts, discharge wards, mortuaries, nurses' homes, laundry, disinfecting apparatus, drainage, &c., &c. The paper, which was far too long to be even read as a whole at the meeting, will be found, when printed in full in the "Transactions" of the Institute, with its numerous plans and other illustrations, a most valuable paper for reference and study in connexion with its subject.)

Mr. P. Gordon Smith said that the paper dealt very largely with the gigantic hospitals of London, and left a great deal unsaid which might be dealt with if time had permitted, in regard to a vast number of smaller hospitals existing, and to be built in all parts of England and Wales. The hospital authority for London was unique, in possessing amongst its members men who were special hospital experts, with a staff of consultative medical superintendents of enormous experience, whose opinions must always carry great weight. Much that Mr. Aldwinckle had referred to, as being necessary and desirable in large hospitals, would be altogether inappropriate in the case of smaller ones. The question of having two entrances had been touched upon, and, however desirable it might be, though he did not consider it to be a necessary condition, it was altogether out of place in a small hospital. Then as to the number of beds, the Asylums Board had fixed a

limit of 500 beds, but that was much too high, though it was more a question for the doctors to settle than for architects to discuss. The architects of the London Hospitals were fortunate in having for clients such promoters of hospitals, with abundant means at their disposal, and with a strong desire to provide everything there could be any excuse for saying was necessary. It was quite different, however, where a hospital had to be provided and supported by voluntary contributions. Some years ago he advocated the omission of the corridors and covered ways, and about that time even Mr. Aldwinckle considered them necessary, and provided them in the case of two big hospitals. Mr. Aldwinckle had now apparently changed his opinion, and advocated the omission of these corridors. He (the speaker) believed them to be quite unnecessary, and, if omitted at the outset, they could be added afterwards, if necessary; in fact, even large hospitals could be successfully carried on and administered without these corridors. Another item which might be saved was the staff laundry, it being wholly unnecessary; it greatly increased the difficulty of management, and was certainly a considerable expense. The gate-porter's lodge should consist of one room and an office, and when nurses were ill with an infectious fever they should use the ordinary wards. He had much pleasure in proposing a vote of thanks to Mr. Aldwinckle for his interesting paper.

Dr. McCrombie said he had been struck by the strong condemnation of the covered way. He had never met anyone who lived inside a fever hospital who objected to it, and for the comfort and convenience of the staff a covered way was a great advantage. He could imagine an objection being made to a corridor, but he hoped that the management of the Asylums Board were not prepared to dispense with a covered way. He believed that the terrazzo flooring might form a solution to one of the great difficulties they had to contend with. The floors should be kept scrupulously clean, but he was afraid they were never so clean as they should be. Mr. Gordon Smith had said that the porter's lodge should consist of one room instead of two or three; but the gate was an important thing, and it was essential that the porter should have control over the officials. The porter should, therefore, be a married man, and have a house for himself.

Dr. Goodall could not see the reason for having two entrances. He was also surprised to hear Mr. Aldwinckle say that there should not be any covered ways, as it was had enough to have to go from one ward to another on a cold night in the open air. During the past year he had been able to convert his committee to covering a way between two blocks, and it had proved a great convenience to the staff.

Mr. E. T. Hall considered this was one of the most important papers they had heard for a long time. He would like to know from Mr. Aldwinckle whether he considered a hospital of 200 beds preferable to one of larger size? Because in another part of the paper he said it was the administrative features of a hospital which so largely added to the cost. He believed that the manager of the Asylums Board had found a usual unit, from the administrative point of view, was to deal with a population of 50,000 people, and taking the standard of one bed per thousand. That was one of the grounds, he understood, on which they decided to make their new hospitals to contain about 500 beds, though they had never laid down any actual limit. He had listened with some interest to Mr. Aldwinckle's observations as to the two entrances, but he could not see what difference it would make whether there was one or two. As to the porter's lodge, he believed the theory held by the managers of the Asylums Board was that the gate porter should be a man who was of superior caste to the ordinary man-servants of the hospital; that he should be a man of considerable responsibility—say of the class of a sergeant-major; and that he should have home comforts, which would not necessitate his mixing with the staff of the hospital. For that reason it was suggested that he should not only have a bedroom, but also accommodation for children. On the Continent covered corridors had been done away with, but it must not be forgotten that people abroad had not always that consideration for the servants that we in England had. Irrespective of the doctors and the nurses, the servants had to be considered, and all the committees he had come in contact with thought it necessary to have corridors for the comfort of the staff. Such sanitary appliances as were used in some of the foreign hospitals would be at once

condemned in this country. Mr. Aldwinckle seemed to suggest that hot-water pipes should pass round the wards, but he considered that most objectionable. They were simply lodgements for dust, and it was far from easy to get at the bulk of them to clean them. It was better to put the heat where it was desired to check the radiation from the windows. The covering of the walls was a matter of great consideration. Cement had been recommended by Mr. Aldwinckle, but he (the speaker) had patented a new process of covering the walls with large sheets of glass, which would be a permanent decoration, and, at the same time, be impervious to disease germs.

Dr. Downes remarked that Mr. Aldwinckle's most important point was as to what should be the size of the hospitals, but that was not altogether an architectural question. He thought everybody would admit that the larger the hospital the greater the economy in its construction and administration. At the same time, the Asylums Board had gone quite far enough in their concession to economy when they took 500 beds as the figure in their instructions to architects. He hoped they would resist, as far as possible, any pressure to increase the accommodation. Indeed, he did not think any medical superintendent could give the individual attention which was so necessary if a hospital for acute cases was to exceed such a figure. The question of how many beds should be put on an acre was a fallacious basis to go upon, because there might be 100 acres of land, and yet the hospital might be crowded into one corner of it. He would rather see, as the Asylums Board had laid down, some definite minimum of areas between the constituent blocks of the hospital, as being the governing principle, which should be looked to.

With regard to points of structure, one of the great principles which should be looked to was to enclose as little as possible. The less enclosure they could do with the better from the medical point of view. As to the vexed question of corridors, he had observed that if he went to a hospital where they had corridors he was told they could not do without them, while, if he went where there were no corridors, they said they did not want them. He agreed that the gate-porter should not mingle with the staff, and he might really live outside. He was somewhat conversant with the circumstances under which the width of 26 ft. was adopted for the wards by the Asylums Board. It was urged that the greater the width the greater were the difficulties of cross ventilation, and although he had pleaded for a width of 26 ft., he should be sorry to see a greater width. In fact, he would rather see the linear bed space than the cross-section of the ward increased.

The vote of thanks was then put to the meeting, which it was very heartily received.

Mr. Aldwinckle, in replying, said he had gone into the question of large hospitals, because the extremely small ones were so admirably provided for by the plans issued by the Local Government Board. There was a distinct and definite reason why outsiders, who had business with the hospital, should be taken into a non-infectious part, and have no opportunity of coming into contact with the infected part of the hospital. No doubt hospitals cost a good deal of money, but he did not believe that the Asylums Board were spending more than other people, because the hospital at Glasgow was to cost as much as the London hospitals, and yet it would not contain so many beds. He did not believe the large hospitals were cheaper than the smaller ones; they should compare good hospitals in London, with good ones in the provinces. With regard to the covered ways, he did not mind being told he had been converted, as long as it was in the right direction. The majority of isolation hospitals in England were built without covered ways of any kind. Mr. Hall seemed to suppose that he advocated hot-water pipes round the wards, but that was by no means his intention. He was sorry that Dr. Downes had arrived at finality in the width of wards, but he admitted that the increase of width seriously increased the expenses.

The President announced that the next meeting would take place on Monday, March 11, when the meeting would be a special one, to elect the Royal Gold Medalist for the current year, to be followed by a business meeting for the election of members.

The proceedings then terminated.

ARCHÆOLOGICAL SOCIETIES.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—On the 20th ult. a meeting of this Association was held Mr. C. H. Compton in the chair. It

was announced that subscriptions had been collected in Ireland and elsewhere for the purpose of effecting excavations in the Hill of Tara, and that the Association had consented to send a representative to help to superintend the proposed works. Mr. Quick described a curious bed-warmer from Bromley, Surrey, now in the Horniman Museum. Mrs. Dent, of Sudeley Castle, sent for exhibition a drawing of a bronze steelyard, found at Winchcombe, bearing various arms and devices of Richard, King of the Romans, the founder of the adjacent Hayles Abbey. Mr. Loftus Brock, F.S.A., exhibited a series of ancient seals of various English personages, illustrating the art of the fourteenth century. Mr. Oliver described a bellarmine of Flemish manufacture, found recently in the east of London. Mr. Barrett produced rubbings of the enamelled brass of Sir N. Gainsford and Lady for Carshalton Church, Surrey, erected during the lives of the persons represented, the date, 14— never having been filled in. The monument is on what was until recently the north side of the chancel. Mr. Thos. Blashill exhibited a series of beautifully-written charters and grants, relating to Sutton-in-Holderness, some retaining the seals. One of these documents, dated 1349, the year of the Black Death, indicated many changes of ownership of property owing to that calamity. One of the seals was the impression of an antique gem. A paper was then read by Mr. Richard McDonald on the Hill of Tara and the proposed excavations. After describing the condition of the hill and the various ancient forts, the remains of which still exist upon it, the notices of the old Irish chroniclers were passed in review, not the least remarkable of which is the record of the burial of the Princess Teah beneath the hill, in a sepulchre of stated dimensions.

Correspondence.

To the Editor of THE BUILDER.

LONDON BRIDGES.

SIR,—Advertising to Mr. Mountford's remarks in the discussion after the reading of your paper on the 18th ult., it may, perhaps, be not inopportune to say there is a bridge of the kind he cited across the Thames. The Maidenhead Railway Bridge was built of brick by I. K. Brunel in 1835, with a span which had not been before attempted in that material—128 ft. for each of the two elliptical arches, with a rise of 24½ ft. only. The red-brick piers at Charing Cross are, I believe, the original piers of Hungerford Bridge; they have lately been lengthened up-stream for a widening of the railway.

W. M.

COUNTY BUILDINGS, DURHAM.

SIR,—On February 9 you called attention to the delay in settling this competition. You repeated the two reasons officially given for this, first, the illness of the assessor, and second, the near approach of the elections. These reasons are more official than anything else. In the West Riding it seems to be known that the assessor did make his award to the county officials before the last quarterly meeting (January 30), and this award was not accepted. After the meeting the above official reasons for delay were published.

By the conditions of the competition the council agreed to call in a "competent architect" to assist in the selection. No one knowing the assessor would question his competency to act as an architect, but, strictly speaking, he is a county surveyor and engineer, and would be described as such.

Architects engaging in this competition had a right to expect that an architect of standing in the profession would have been appointed to assist in its settlement; certainly the award of such a man would—rightly or wrongly—have had more weight with the profession. "A COMPETITOR."

The Student's Column.

BRICKS AND TERRA-COTTA.—VIII. & IX.

FUSIBILITY OF BRICK-EARTHS.

THE raw material, as previously remarked, is entirely made up of mineral matter, whether of organic or inorganic origin. These minerals may, roughly speaking, be divided into two groups, according as they are fusible or infusible. We have to ascertain how far the infusible portion may, on the application of heat, be melted or partially melted by the fusible ingredients—in other words, whether the latter act as fluxes. Then we want to know whether any two or more of the in-

fusible substances are capable of forming fusible compounds. The subject appears, at first sight, rather complicated, but by a species of analysis we trust to make it very easy. We must not anticipate however. The simplest way to commence is to experiment with the degree of fusibility of the various minerals concerned, or rather of certain of these and their compounds; for, as may be imagined, those which are fusible do not all melt at the same temperature, or under the same conditions.

Silica.—This occurs in clays in three different states—namely, crystalline, amorphous, and as entering into the composition of different compounds. When crystalline it is known as quartz, which mineral and flint (the amorphous kind) are the common constituents of sandy brick-earths and loams. It is infusible except at the very highest temperatures, but when existing as pure quartz it neither softens nor melts at the highest furnace temperatures. It may be decomposed, however, by carbon in the presence of iron (amongst other things) at a white heat, forming a silicide of the metal. Silica, naturally, combines with all the bases capable of forming silicates, and is then fusible. Seeing that by far the greater proportion of the sandy constituent of brick-earths is made of quartzose and flinty grains, we thus know that much of the material is quite refractory. As will be gathered from what we have just said, in order to make satisfactory fire-bricks where the raw material is chiefly composed of silica (e.g., as that of the Vale of Neath, Glamorganshire) it is necessary to add a small proportion of some base, such as lime, to the earth in preparing the same, and the quantity to be added may vary from 1 to 2½ per cent, according to the proportion of bases present in the raw material. See also our observations under the headings of lime and magnesia, to follow.

Alumina.—When pure, this, also, is infusible; it does not generally combine with bases, which fact is of great importance from a metallurgical point of view, and is advantageous in many respects so far as brickmaking is concerned. Even when it does combine, the aluminates formed are not so fusible as silicates. In nature, however, it is frequently impregnated with so much iron that it is difficult to separately consider each body, at least as affecting our present inquiry. When iron is absent, alumina is very refractory.

Lime.—A base which, *per se*, is infusible, but when combined with silica and other acid substances becomes fusible—a point the student is specially desired to note. It may not be unprofitable here to remark that when the lime exists as calcium carbonate, the carbonic acid of the latter is driven off by heating, leaving simply the base behind. This basic substance, when the carbonate of lime exists as small pellets, may remain in the brick practically uncombined (only badly agglutinated), and in any case the quality of the brick is seriously affected, generally by the creation of small holes from which a number of minute cracks radiate irregularly. Even when these are not very apparent, from the circumstance that the fragments of carbonate of lime were very small, it may be assumed that the combined effect does not, on the whole, improve the finished product. Apart from other considerations it would appear that to artificially mix lime (which has been deprived of carbonic acid), with the pure silica and alumina in such quantities as will hereafter be given, is preferable to mixing ground limestone, or chalk. We are speaking, of course, of the best quality of bricks, chiefly intended for refractory purposes, and the student will understand that this is rather a standard to be worked up to than to be adopted in its entirety for low-class bricks. From financial and other purely commercial reasons, ordinary building bricks cannot always be made on the most approved basis, and good grinding and pugging can materially minimise the effects of those substances having a tendency to deteriorate quality.

Magnesia.—This behaves in some respects like lime—it is basic and infusible. In the manufacture of bricks and linings for certain steel furnaces, and in making basic bricks generally, magnesia limestone is largely called into requisition. This rock, sometimes erroneously called dolomite, is typically composed of equal proportions of the carbonates of lime and magnesia. Before it is used, therefore, the carbonic acid is driven off by calcination. Magnesia, when combined or mixed with silica and other acid bodies, forms fusible compounds.

We have now dealt with the principal bodies forming the basis of clays: if the student turns to the last article he will notice that clays are chiefly made up of silica, alumina, lime, and magnesia—

the four substances that have just been described. It will have been observed that by itself each of these is practically infusible, but is ready to form a fusible compound with suitable bodies. They are essentially refractory, and may combine together in certain proportions without losing their refractory nature. Let us now consider the behaviour under great heat of other minerals and substances commonly found in brick-earths.

Iron Pyrites.—This parts with about half its sulphur at a white heat, and forms ferrous sulphide. Mr. Robert Mallet, F.R.S., has observed that unless this mineral is separated from the clay in the preparation of the earth for brickmaking, it is impossible to obtain either durable or well-coloured bricks from the material. The pyrites in the kiln is but partially decomposed, oxide of iron and basic sulphides of iron remain. When at an after period these are exposed to air and moisture, which are absorbed by the brick, oxidation takes place, sulphate of iron, and frequently also sulphates of lime or soda (sulphates with double bases), are formed, and, crystallising within the mass of the brick, split it to pieces.

Iron Oxide.—This appears in nearly all the analyses of clays that we have given. According to the observations of Mr. Arthur H. Biorns,* it is very stable, non-volatile, and of a red colour. At a white heat it gives up oxygen. By heating with carbon, or carbonic oxide, it is reduced to the metallic state; but if much carbonic acid is there, ferrous oxide may be formed, which combines with any silica present, forming a fusible silicate; for this reason it is sometimes used as a flux. In presence of sulphur it oxidises that element to sulphurous acid. The existence of a considerable amount of iron oxide in clays therefore is injurious, though a small proportion may be useful (depending on circumstances) as acting as a flux. At the same time we must remember that many clays rich in alumina, silica, and iron will hardly fuse at the melting-point of cast iron, whilst bricks are usually baked rather below a yellow or white heat; but we shall have occasion to refer to this in more detail later on.

Fluorine occurs but sparingly in brick-earths; when combined with calcium, forming calcium fluoride, or fluor spar, it acts as a flux by uniting with silicates, and by reacting with silicates and dissolving the gas silicon fluoride. It also forms fusible compounds with sulphates such as selenite or gypsum.

Sulphate of Lime is found in practically all strong clays in the crystalline form (transparent crystals of selenite); also in thin, streaky, and early beds in the Midlands, in its fibrous and amorphous forms. In the latter case the beds are commonly alluded to in the brickyard as "gypsum veins." It need hardly be remarked that in presence of sufficient heat, far below that required in the manufacture of bricks, hydrous sulphate of lime decrepitates, when the sulphuric acid is driven off and we have plaster of Paris, practically the same observations in regard to its general behaviour apply as were made in referring to lime. It is not a desirable constituent of brick-earths except in small quantities.

Potash and Soda are, in nearly every instance, present in clays and brick-earths in such small proportions as that their occurrence is a matter of little moment. If, perchance, the sandy portion of the earth contains much of the mineral laumontite, however, as in certain Cretaceous green marls, the potash is by no means insignificant. Speaking in general terms, these alkalies combine readily with silica in the kiln, and an excess of them therefore tends to render brick-earth too readily fusible.

Sodium chloride, although not indicated in any of the analyses of brick-earths we have given, exists in extremely minute quantities in nearly all of them. It is very commonly met with in the marls of Triassic age in Cheshire and elsewhere in England, in which case the earths are either totally unfit for brickmaking, or they have to be specially treated to get rid of it. In any case the bricks produced are generally inferior in quality, for the reason presently to be given. The student should understand, however, that all the marls of the Trias are not impregnated with salt; indeed, some of the best building bricks in the country are manufactured of the new Red marl. Chloride of sodium, or common salt, says Mr. Mallet,† is not only a powerful flux when mixed even in very small proportion in earths, but possesses the property of being volatilized at the heat of the brick-kiln, and in that condition

it carries with it, in a volatile state, various metallic compounds, as those of iron, which exist in nearly all clays, and also act as fluxes. The result is that bricks made of such clays tend to fuse, to warp, twist, and agglutinate together upon the surfaces long before they have been exposed to a sufficient, or sufficiently prolonged, heat to burn them, to the core, into good hard bricks.

Apart from the salt found in the natural raw earths used in brickmaking, we have to consider here the accidentally, or purposely introduced salt into the material in process of manufacture. In certain districts the sand used by the brick-moulder to prevent the clay from adhering to his mould or table, or used in connexion with machinery to effect the same end, is impregnated with salt obtained either on the sea shore, in low cliffs, or inland. At first sight it would seem that the quantity thus employed is too small to have any practical effect in the burning, but such is not the case. Indeed, in certain districts we could name, an extra amount of this fine, sharp, quartzose sand with salt, is used expressly to put a sort of veneer on the exterior of bricks that would otherwise not appear to be of such good quality. We do not wish to expose any secrets of the trade, and we do not desire to convey that the veneer thus produced has not an exceedingly beneficial effect so far as weathering is concerned; but we cannot shut our eyes to the fact that many of the skin-deep hard bricks sometimes present a very similar appearance to goods of infinitely superior quality as being hard throughout, instead of at the surface only. The result produced when such bricks are cut for face-work can be better imagined than described, though we have no doubt that the "jerry-builder" would be able to surmount that little difficulty. We should not like to answer for the number of cases in which these "hard-faced" bricks have been made to do duty for what was believed to be bricks of a very different stamp, and paid for accordingly. The uses of salt and similar substances to make a hard, if brittle, face on various classes of brick goods have been known for some years. So long as these are not put to a dishonest purpose we have no objection to them, but we thought these few notes on the matter would not be out of place.

In some instances sand from the estuary of the Thames, of course impregnated with salt, has been employed for the purpose named, though we know full well that in most cases it is used openly and the products are correctly described. The moulding sand serves other useful purposes; it assists in preventing the clay from cracking, though we think its value in this respect is much over-rated. Salt in the moulding sand also influences exterior coloration to some extent, imparting a grey tint when burnt.

Carbonaceous matter is not, on the whole, a desirable constituent of brick-earths. Under certain conditions it does not burn completely, so that there is discoloration locally, and not infrequently it renders the interior of the brick a different tint to the exterior. This remark applies more particularly to stiff and dense clays. We refrain for the moment from alluding to the carbonaceous matter introduced in the shape of cinders and "breeze."

THE INGREDIENTS OF COMMON BRICKS.

It is not easy to sum up in a few words the several qualities which together constitute a good brick-earth, or to state what should be added to or eliminated from a raw earth to render it fit for specific purposes. There are so many different kinds of bricks, and they are required for such diverse objects, that what would be regarded as a desirable property in one, might be looked upon unfavourably in another. Not only this, but the earths themselves are ever varying, and it is often rather a question of how much of a certain deleterious ingredient may be admitted than what should theoretically constitute a good earth. Nevertheless, we will try to lay down a few general principles.

Probably no two brickmakers agree as to the proper or best way of proportioning the different ingredients used in the manufacture of their bricks. Commencing with those of common bricks, they may be of clay, marl, and loam in all their variety, with the mixture of a variable proportion of sand, chalk, breeze, small coke, &c. The clay may be red, yellow, blue, greenish blue, grey, or mottled, it is often light, loose, and sandy, frequently heavy and greasy, and mostly friable when exposed to the air for any considerable length of time. Remembering what has already been said, it will

easily be recognised that if a clay contains a surplus quantity of sand, it will require the assistance of some dry substance to modify the action of the fire in burning, as the siliceous particles will fuse and run, in presence of suitable bases (such as are often found in common brick-earths,) under the action of intense heat. In such cases, it is clear that an increase in the quantity of the chalk will be of great service if properly blended with the clay, because it will combine with the silica, or rather assist in its partial fusing or agglutination. The object of adding breeze, coke, &c., in the preparation of earths for ordinary building bricks is to assist in thoroughly burning the material inside as well as outside. From this it will readily be seen that where the ingredients of the brick-earth have a tendency to melt or run, it is desirable not only to prevent that in the way just indicated, but to materially decrease the quantity of breeze mixed with the clay; otherwise the whole will form clinkers instead of good bricks. The more alumina there is in the clay the better will be the brick if it is properly tempered by the admixture of sand and breeze, the one to burn it, the other to prevent its shrinkage, as far as possible, when in the kiln.

Referring to malm-bricks, the basis of these consists of marl—an intimate mixture of clay and carbonate of lime, which is generally easy to work. To obtain fine-grained bricks of even colour, it is advisable to introduce both sand and breeze, the latter in larger proportion, perhaps, than with commoner kinds of clay, because the lime incorporated with the earth demands that the latter shall be burned more evenly throughout than when the base contains a greater quantity of silica. Moreover, the sulphur in the breeze combines with other ingredients in the alumina, and tends to brighten the colour of the brick by turning the clay more or less white, for when clay contains a large proportion of alumina, it has a tendency to turn white under the action of fire. From the foregoing it follows that if we add a large quantity of breeze to a clay overcharged with quartzose sand, the whole will most probably melt, and not run together in the proper form; whilst if, on the other hand, we do not add much breeze when there is only a little sand present, but an increase of alumina, the bricks resulting therefrom will be brittle and porous for want of a sufficiently disseminated flux to solidify them.

Now, as to the effect of adding clean quartzose sand to a clay poor in that material. If a strong clay, perfectly plastic, be moulded and left to dry it will be observed, in the majority of cases, that on contraction during the process a number of minute cracks form, which will widen out as the material becomes drier. The same thing will happen if the newly-moulded brick be subjected to the fierce heat of the midsummer sun, unless precautions are taken to shield them therefrom, even when the earth has been fairly well prepared. We cannot enter now into the various processes of artificial drying; the student will understand that in drying in the open air uniformity is the principal thing to be aimed at. A great deal depends, however, on the relative plasticity of the raw earth and the amount of water it contains. It has been laid down as a wholesome maxim that the quantity of moisture the clays naturally absorb should be interfered with as little as possible; in other words, the smallest quantity of additional water that will suffice to render the mass sufficiently workable should be employed in moulding.

In brickyards of small magnitude the earth should be as fresh as may be, and used directly it is brought to the moulder's table. We know perfectly well that familiarity with the material leads the intelligent workman to preserve it by covering it over with cloths and the like when not immediately used, but delays, especially in hot or windy weather, not only lead to difficulties in moulding the clays rapidly; they tend to produce inequality in size of the finished product, irregularity in drying, and so forth.

Assuming, however, that all these little things be well understood, we have to provide against the tendency in a numerous class of clays used in making common bricks to crack under any circumstances unless precautions connected with the preparation of the earths in the first place are taken. The necessity for such preliminary work may arise not only from the clay used being too strong, but from its containing grosser particles, of any kind whatsoever, than ought to be admitted into any but the very worst quality bricks. In a properly-regulated brickyard turning out good average products the large grit, pebbles, &c., are either ground up, screened, or treated in such a way as that the ultimate result is to improve rather than to deteriorate the earth.

* "Mixed Metals," 1890, p. 57.

† Dobson, "Bricks and Tiles," 1893, p. 267.

In a very large number of instances, especially with the cheaper kinds of bricks so largely used, this work is only done in a very perfunctory manner. We desire to make clear to the student the effect of manufacturing bricks in which the breeze used is not fine enough, or in which pebbles, however small, are allowed to remain. As previously remarked, earth on being dried contracts, and cracks result. If small pebbles are present in it they may affect the general position and direction of these cracks, and by the unequal contraction, or rather the practical stability of the one and the contraction of the other, warp the whole. This effect is further accentuated in the burning process; it may be that the cracks are not obtrusive exteriorly, but the soundness of the whole brick is sensibly modified. The colour, too, is generally mottled, however well the earth may be burnt, when some of the ingredients are too large. Now, as this takes place when the grosser portions are admittedly too large to produce a sound material, everyone recognises the necessity of reducing their size to assure an average brick.

And when the clays used after some of the ingredients are thus reduced in size, would crack or warp, it is customary to intimately mix sand with them, which, apart from any metallurgical effects in the kiln, binds the whole together. In a slipshod fashion fair results have been obtained by moulding the earth in a large proportion of sand.

From the foregoing the student will perceive that the quality of the brick produced from any given quantity of earth, in the manufacture of common building bricks, largely depends on the judgment the bricklayer displays in assigning the proportions of the different ingredients added to the clay. When the clay is heavy, the addition of chalk, or lime, will lighten it; when it contains much sand, chalk will be necessary to take up the sand, so to speak, to keep it from running during burning; if, on the other hand, the earth should be of a marly nature, a little sand will often be of service; with heavy earth a larger proportion of ashes will be required than when the soil is light and friable, and it will be more difficult to burn properly in the former case than in the latter.

Still confining our attention to common bricks, their colour appears to depend upon the proportion of the different materials mixed with the clay, the time occupied in burning them, and the degree of heat to which they are subjected. Chalk, when properly prepared and introduced into the material, has the effect of lightening the colour when burnt.

If lime is not used, it is desirable, in all cases, that as pure a limestone as possible should be employed, and it may be necessary to wash it prior to its being made into "cream," when that is employed. A superabundance of lime in clay tolerably free from siliceous sand causes the resultant bricks to be brittle and spongy, especially when it is not carefully incorporated.

Another point to be borne in mind is that, on burning bricks, the whole of the materials composing the earth, even when not sufficiently agglutinated—through infusible substances being present and not having suitable or adequate fluxing mineral matter—become changed in nature. This change mostly consists in induration of the otherwise unaffected particles. Compound oxides, when exposed to great heat, become exceedingly compact, even though they bear no traces of fusion; it has been observed that a kind of soft brick, producing a surface of pleasant appearance, and largely used in the early Georgian era, has no sign of agglutination, its particles having merely become hardened and compacted in burning. Practically the same may be said of many bricks made at the present day in which strength, and general use, are sacrificed to appearances and ease in cutting.

OBITUARY.

MR. EWAN CHRISTIAN.—We much regret to have to record the death of this well-known and much respected member of the architectural profession, which took place at his house at Hampstead, on the 21st ult. Mr. Christian was born on September the 20th, 1814, and was educated at Christ's Hospital. He entered the office of Mr. Matthew Habershon as an articled pupil about 1830, and afterwards was engaged as assistant in the offices of Mr. Brown, of Norwich, and of Mr. Raitton, with whom he worked on the competition drawing for the Houses of Parliament. Having injured his eyesight by close office work, he spent some time in out-door superintendence of buildings in progress (Lee Church and Colchester Union and some others), and also in making sketches for

"Habershon's Half-timbered Houses." In 1837 he went abroad, spending some months in Italy, having for companions the late Sir Horace Jones and others. After his return he commenced business and gained several competitions. His first church was that of Hildenborough, near Tonbridge, and his first important church restoration (and in competition) that of St. Mary's Church at Scarborough. Since then he has carried out very many church restorations, including those of Carlisle Cathedral and Southwell Minster, several of the London City churches, also many new churches, parsonage houses and schools in various parts of England and Wales, and also among mansions, Lavington Manor in Wilts, Lillingstone Dayrell, near Buckingham; Woodbastwick in Norfolk; a house for Mr. Vivian at Bosahan in Cornwall; and many other private houses. He also built the Bank at Charing Cross, for Messrs. Cox & Co.; the Economic Life Assurance office, Bridge-street, Blackfriars; and the Convalescent Homes at Folkestone and Seaford; a house at Burcot, Oxon, for Lady Crawford (now in course of building), and lastly, the National Portrait Gallery, which he did not live to see quite finished. Mr. Christian held the post of consulting architect to the Ecclesiastical Commissioners since 1850, and a similar appointment to the Charity Commissioners since 1858. He was also for 30 years consulting architect to the Lichfield Diocesan Church Building Society, and to the Carlisle Diocesan Society, and was one of the committee of architects for the Incorporated Church Building Society. He joined the Institute of British Architects as Associate, in 1842, became Fellow in 1850, and subsequently Member of Council, Vice-President, and was elected President for 1884-6, while he received the Institute Gold Medal in 1887. As will be seen from our report in this issue of the last Institute meeting, that body was officially represented at the funeral of Mr. Christian last Monday.

GENERAL BUILDING NEWS.

CHELSEA EMBARKMENT COURT.—Twenty-three town mansions are now being built upon the former site of the Military and Naval Exhibitions, which will in future be known by the above name. The contractors are Messrs. J. Allen & Sons, who have taken the first contract at 92,000*l.*, and the architect concerned is Mr. Deliss Joseph.

ALTERATIONS TO CATHOLIC CHURCH, HAMILTON, N.B.—Hamilton Catholic Church was reopened on the 24th ult., after alterations. The work has been done by: joiner work, W. Downs & Sons, Uddington; painting, A. & T. Aitchman, Bothwell and Hamilton; glass work, H. Smith & Co., Glasgow. The whole has been designed and carried out by Mr. Joseph Cowan, architect, of Glasgow.

ALL SAINTS' CHURCH, HERTFORD.—The opening for public worship of the new Church of All Saints, Hertford—erected in place of the old edifice which, says the *Hertfordshire Mercury*, was destroyed by fire on December 21, 1891, took place on the 20th ult. The style is Perpendicular, and in plan will consist, when completed, of a nave of five bays, 73 ft. long by 26 ft. 6 in. wide, with western tower, about 26 ft. square, and north and south aisles, 20 ft. and 18 ft. wide respectively, with aisles opening into the tower, in which the font will be placed. At present, however, as only four bays out of the five are finished, the length of the nave is about 60 ft. The north porch will be of five bays. There will also be a western entrance through the tower. The chancel is a continuation of the nave, and is 42 ft. long, giving a clear length from the face of the east wall of the chancel to the extreme face of the baptistry wall of 111 ft. by 26 ft. 6 in. wide, or a total width across the north and south aisles and nave of 65 ft. There is a south chancel aisle 33 ft. by 23 ft. with separate entrance and porch; and on the north side of the chancel there is an organ transept 30 ft. long by 15 ft. wide, and about 30 ft. high, with two arches opening into the north aisle. There are also clergy and choir vestries on the north of the chancel. The nave and chancel are about 49 ft. from floor to wall plate, and have open timber roofs of somewhat low pitch, covered with red tiles. The aisles have roofs covered with lead. There is a clerestory of double two-light windows running the whole length of the church; the north aisle is lighted by four-light windows, and the south aisle by three-light windows. The east window has seven lights. The tower will have a turret on the north side carried the whole height of the tower, and terminated by a leaded spirelet, the total height from the floor to the top of the parapet being 140 ft. The belfry stage will consist of double two-light windows, with a somewhat elaborate parapet with pinnacles at each corner and in the centre of each face; the height from the floor to the top of the parapet being about 115 ft. The exterior doors of the church are in oak, with ornamental wrought-iron strap hinges and fastenings, the latter being made at Mr. Hunt's forges at Hoddesdon. The seating is by means of open benches in plain oak except in the chancel aisle, where the seats will be provided with sloping seats, panelled backs, moulded rails, and moulded solid ends and canopied shafts. At the present time there is seating accommodation for about 700. Four open benches on the south side of

the nave are specially provided for the Mayor and Corporation. The communion table is of carved oak. The altar rail is of moulded and carved oak. The credence table on the south side of the chancel is of Runcom stone, carved, and the sedilia is of the same kind of stone. The lower portion of the pulpit is of moulded and carved Runcom stone, and the upper portion of moulded Mansfield stone, with moulded shafts and traceried panels. It is approached by three steps from the choir floor. The chancel aisle is a stained glass four-light window with tracery openings above, depicting the four martyrs, St. Stephen, Peter, Matthew, and Paul. On the south side is another stained glass window of three lights, representing episodes in the life of St. Elizabeth and her son, St. John the Baptist. The flooring of the sanctuary and choir is laid with encaustic tiles, with polished stone borders, while that underneath the altar is of pitch-pine blocks, the passages being laid with Yorkshire flags. The lighting of the church is by means of six gas pendants on each side of the nave and chancel, suspended from the hammer-beams of the roof, while the aisles are lighted by ornamental brackets fixed on the walls. This part of the work has been carried out by Mr. C. H. Weston, of Castle-street, Leicester. The fittings being prepared by Messrs. Hart, Son, & Peard, of London. The warming is on the low-pressure system, the work having been carried out by Messrs. Seaward & Co., of Lancaster. The stone used for facing the walls of the edifice both internally and externally, is flecked red Runcom stone from the quarries at Haverham, near Lichfield, Cheshire. The architects were Messrs. Paley, Austin, & Paley; the contractors, Messrs. Smith Bros., and Mr. J. A. Hunt, and the clerk of the works, Mr. A. Fincham. The stone-carving was carried out by men in the employ of Mr. Bridgeman, of Litchfield; and the whole of the wood-carving by Messrs. Hargreaves, of Lancaster.

EXPANSION OF CHURCH SCHOOLS, LEEDS.—St. John the Baptist Church schools, situated in Newtown, Leeds, have been enlarged. In 1862 the buildings were condemned by the Education Department. It was decided to add another story and cover the whole with a new roof. Before the extension was commenced there was accommodation for 190 children and 110 infants. Now 551 children can be accommodated. Besides the enlargement, four cloakrooms, with lavatories, have been provided. The upper rooms are approached by a new fireproof staircase. The infants' department has been remodelled, and a classroom and lavatory added. Hot-water pipes have been introduced, the rooms fitted up with wood dadoes, the windows reglazed, the roof-timbers dressed, moulded, and varnished, and new Welsh slates substituted on the roofs. An entirely new system of drainage has also been carried out. Mr. W. H. Dewes was the contractor for the brick and stone-work; Mr. Bank Mawson for the woodwork; Mr. J. W. Watson for the plaster-work; Mr. James Seaton for the slating; Mr. Rowley for the plumbing and glazing; Mr. George Thompson for the painting; and Mr. Joseph Wolfenden for the heating. The several works have cost about 2,000*l.*, and have been carried out under the superintendence of Messrs. Smith & Tweedale, architects, Leeds.

SANITARY AND ENGINEERING NEWS.

SUTTON-IN-ASHFIELD SEWAGE PURIFICATION SCHEME.—On the 22nd ult. Colonel Durnford, R.E., one of H.M. Local Government Board Inspectors, held an inquiry into an application of the Sutton-in-Ashfield Urban District Council for sanction to expend the sum of 9,600*l.* for completing the sewerage of the town, for purchase of land, and for works of sewage purification. The present population of Sutton-in-Ashfield is 10,563, which is rapidly increasing. Mr. M. C. William Bishop, Surveyor to the Council, produced and explained the plan stating the urgent necessity for immediately carrying out the work of sewage purification, in order to meet the wishes of the Duke of Portland. The international Ferrozene and Polarite process of purification has been selected.

THE NORTH BERWICK DRAINAGE SCHEME.—On the 15th ult. the North Berwick Police Commissioners held a meeting in the Council Chamber to give opportunity to all persons interested in the drainage scheme adopted by the Board to be heard thereupon. No objectors appeared. The scheme is to be carried out in accordance with plan prepared by Messrs. Belfrage & Cairne, C.E. Edinburgh, at an estimated cost of 1,300*l.*

FOREIGN AND COLONIAL.

FRANCE.—The work of restoration is to be resumed shortly at the Château de St. Germain Laye; it was commenced in 1862 under the direction of M. Millet as architect, who died in 1871 and was replaced by M. Daumet. The work was stopped in 1890, and the building has seriously suffered since then from want of attention. Mr. Millet, who was a distinguished artist, had endeavoured to restore the château to its condition as it was under Francis I. He preserved, certainly, the last tower of Charles V., but he destroyed the large pavilions of Louis XIV., finished in 1680. The chapel of St. Louis, older than the Sainte Chapelle,

at Paris, and remarkable for the disposition of its square windows, was restored during the period from 1859 to 1877, and M. Millet has found and restored the rose-window, which had been bricked up at the time when the chateau was used at once as a prison and barracks.—The Chamber of Deputies has voted the necessary credit for the restoration of the Theatre d'Orange.—The first railway at Tonkin has been opened. The line, which is 200 kilometres in length, is both strategic and commercial in its objects.—An international artistic and industrial exhibition is to be held at Toulouse from May to October.—A local railway line has been opened between Autun and Châteauneuf.—The cost of improving the port of Havre, for which funds have been voted by Parliament, is estimated at 42,500,000 francs.—At the cemetery at Narbonne some workmen have found a fine mosaic of the Gallo-Roman epoch, about 26 square metres in extent. The designs are formed entirely in white and black cubes.—The death is announced of M. Georges Guillemin, member of the Société Centrale des Architectes, at the age of forty-seven. He studied originally at the École des Arts et Métiers at Angers, and subsequently entered the École des Beaux-Arts at Paris, in the atelier of M. Laisné. He carried out numerous works, both at home and abroad, and had been commissioned to carry out the Hôtel des Postes at Périgueux, his native town.

GERMANY.—Messrs Siemens & Halske have applied for a concession for the extension of the Berlin Overhead Electric Railway, now in course of construction, in view of the 1896 Exhibition. The proposed line is to run from the Schlesischer Thor to Treptow Park.—The project for the Suspended Railway, in Langen's system, has been abandoned, principally owing to the impossibility of connecting the proposed line with the existing systems.—According to a statement by the Secretary of State in the Budget debate, the opening of the Baltic and North Sea Canal will take place towards the end of the next year.—An international assemblage of warships, contemplated.—Important innovations have been made at the Royal Museum for casts from classical works at Munich, under the direction of Professor Dr. Furtwängler. The library of the Archaeological College has been incorporated in the museum, and a new apparatus installed for the projection of magnified images of works of art, which is said to be a very useful adjunct to lectures.—The city of Strasbourg has handed over the museum, the fourth largest in Europe, to the University authorities, who will receive nearly 1,000,000 annually for the management of the collections. The city has, moreover, voted 15,000, towards a new building.—The marble bust of Ernst Curtius, set up, in commemoration of his eightieth birthday, at Olympia, in Greece, will be unveiled next April.

MISCELLANEOUS.

AN ANCIENT FAMILY SEAT FOR SALE.—Lord Oult is offering for sale his estate at Hinton St. George, near Crewkerne, a property which was held during the reigns of Richard I. and John, by the Howells. Having passed to the Deanehands, it was bought in marriage by Elizabeth, daughter of John Ceneand to Sir William Paulet, knight, of Leigh-saulet, Devonshire, descendant of Hercules, Lord Tournon, Picaudy, who came to England with Henry, the Anglo-French. Their son, Amayas, was knighted on the field of Navas de Trent, June 16, 1187; he committed to the stocks Wolsey when a schoolmaster at Limington, in this county; and afterwards became Treasurer of the Middle Temple, where he erected the gate-way, rebuilt by Wren. John Paulet, or Poulett, of the direct line, was created, 1627, Baron Poulett, of Hinton St. George; John, fourth Baron, was advanced Earl Poulett, 1698; Anne, Hinton House, famed for its collection of prints and pictures—including works by Rubens, Van Dyck, Murillo, Correggio, and Rembrandt, was built reputedly by the above-named Sir Amayas; it was altered and enlarged circa 1830, by the then Earl Poulett. Views will be found in J. P. Neale's "Seats," and vol. ii. of the Rev. John Collinson's "History of Somersetshire," 1791. Amayas's grandson, who died 1566, was the keeper, for a while, of Mary, Queen of Scots. The first baron, of his son, were knighted on board of the *Marigold*, in 1635, and were zealous adherents of King Charles I.

DIOCESAN SURVEYORSHIP OF ST. ALBANS.—We are officially informed that Mr. F. Trevor Davys, Vicar-in-charge, Herts, has been appointed surveyor to the Diocese of St. Albans. A former tenant in our columns, implying that the appointment had been conferred on another person, appears to have been incorrect, but we are not responsible for the error.

THE IMPERIAL PALACE AT BERLIN.—Our German contemporary, the *Deutsche Bauzeitung*, describes the numerous alterations which have been made at the Berlin "Schloss," which serves as a town residence for the Emperor, William I., and a small palace in the thoroughfare Unter den Linden, using the reception-rooms of the Schloss for ceremonial only. The present Emperor's more pretentious Court, with its court ceremonies, however, requires a proximity to the residence to the reception-halls, and the Imperial Royal, and some suites of apartments have

hence been retained in the block for the Imperial Family and their entourage. The building, however, required some modernising, both in arrangement and decoration, and the builders have been constantly at work since the Emperor's accession. The most important improvement which is of interest to the general public is the remodelling of the historical "White Hall," which was last decorated by Professor Stüler in 1844. This time Herr Ihne, one of the Court architects, was commissioned with the rearrangement. This has been done by altering the grand staircase which leads to the hall, and adding a *foyer*, besides entirely altering the decoration by giving the hall an imposing columnar treatment. The hall measures 31 metres by 16 metres, at the narrow end of which is the staircase, 16 metres by 11 metres. The other narrow end and one of the long sides face thoroughfares. Along the second long side is the new *foyer*, which measures 43 metres by 7 metres.

TRADE DINNER.—Messrs. Vernall, Danes & Co., builders and contractors, 12, Albany-street, N.W., gave their anniversary dinner on the 16th ult. at the "Bedford Head" Hotel to about ninety of their employees and guests. At the suggestion of Mr. Hobbs, a collection was made for the unemployed.

MOORLAND CHURCHES.—On the 21st ult., at the Plymouth Athenæum, Mr. H. Worth, C.E., lectured on "Mooreland Churches." His introductory remarks were devoted to a sketch of the growth of ecclesiastical architecture in England, and he briefly summarised the features of the Norman, Early English, Transitional, Decorated, and Perpendicular periods. A large number of photographic views were then thrown upon a sheet by means of an oxyhydrogen lantern, being for the most part representative of moorland church architecture. St. Mary Magdalen's Church, Tarncliffe, was illustrated, being one of the finest specimens of a Perpendicular tower in existence; and a number of pictures of moorland churches, chiefly of the Perpendicular style, followed. One of the most interesting of moorland churches—that at Meavy—claimed a good deal of attention, and it was pointed out that traces existed here of a Norman building. The tower of Sheepshead was shown to be out of all proportion to the church; and that of Shugh Church was said to be one of the best built towers on the moors. The churches of Cornwood and Walkhampton were hastily noticed, a feature of the capitals of these buildings being the superficiality of the mouldings. Referring to Buckland Monachorum Church, the lecturer observed that this structure was in an extremely unsatisfactory state, the enlargement and repairs having been very carelessly done. A brief discussion followed, during which the Chairman said connected with nearly all the moorland churches were priests' houses. The Perpendicular period was a great church building and restoring period all over England, and especially in Devon, Cornwall, and Somerset. He had no doubt that in years to come the Victorian era would be regarded as a great church-restoring era. In reply to a question, the lecturer said in many cases the remains of older religious houses are embodied in the present moorland churches.

NOTTINGHAM MASTER BUILDERS' ASSOCIATION.—Members of the Nottingham Master Builders' Association assembled on the 22nd ult. at the Lion Hotel, Clumber-street, on the occasion of the annual dinner of the Association. In the absence through indisposition of the President (Mr. Erich Hind), the chair was occupied by Mr. George Pule. The Chairman proposed "Success to the Master Builders' Association," remarking that when he addressed them on the occasion of the last annual dinner he said they were desirous of establishing a uniform code of working hours. So far that had not been brought about, but he hoped that during Mr. Hind's tenure of office they would be able to accomplish it, so that all trades might commence work and finish at uniform hours. The financial condition of the Association, he was pleased to say, was very flourishing. They had gone to considerable trouble in working out a schedule of prices during the past year, and they were hoping that a deputation from the Association would shortly meet the architects in the town on that subject. There was no doubt that such a schedule of prices as had been compiled would prove of great benefit to the master builders of the Association. A deputation of the Association had met the Borough Engineer in regard to matters relating to drainage; and it was proposed to meet the Works and Ways Committee and the Engineer with respect to the by-laws of the town. Further than that, the Association had no doubt before them several important matters bearing upon the building trade, and it behooved the members to hold together and to give every support to their President during the ensuing year. He was pleased to say that the greatest good feeling existed between the masters and workmen in the building trade in the town, and also between the masters, builders, and the local architects; and it seemed to him there was every prospect of success for the Association and the building trade. Mr. J. W. Woodsend responded. When he first became connected with the Association, he said, they experienced considerable difficulty in getting builders to join, but he was proud to say their membership was now something like fifty. Mr.

James Wright proposed "The Town and Trade of Nottingham," remarking that though the builders had gone through a period of depression in trade, there were encouraging signs of an improvement in the near future. Mr. Woodsend responded, and said the Corporation had done very much to improve the town during the last thirty years.

PARTNERSHIP.—A partnership has been entered into between Mr. George Highton, F.R.I.B.A., Diocesan Surveyor of Bedford, and Mr. Arthur Ardron, F.R.I.B.A., of 39, Victoria-street, Westminster. The united practices will be carried on at No. 39, Victoria-street, Westminster, as Highton & Ardron, with a branch office at 5, the Crescent, Bedford.

BRADFORD BUILDING TRADES.—The members of the Bradford Building Trades' Exchange met at the New Inn, Bradford, on the 21st ult. Mr. E. Dyson, who presided, said that they met about two years ago to complain of the rates charged by the various railway companies for the conveyance of stone from Bradford to other places. At that time letters were sent to the Board of Trade and to each of the railway companies, who had replied that they would look into the matter, but nothing had as yet been done. Some of the members of the Exchange had refused to pay the extra charge, which, in some instances, had been enforced, while in others the members had been excused. The Secretary (Mr. A. Gable) said that the general effect on the alteration had been an increase in the freight of 5 per cent. After discussion, it was resolved that traders forwarding stone by the various railway companies make out a list of rates from and to the various receiving stations, showing the old and new rates, and protest against paying any increased rates as the trade will not warrant an increase. It was also decided that each of the members should forward a similar memorial and notice of opposition to the Board of Trade.—Bradford Argus.

LEGAL.

DECISION UNDER THE LONDON BUILDING ACT, 1894.

On the 14th ult., Mr. Arthur Crow, District Surveyor for Whitechapel, was summoned before Mr. Haden Corser, at the Thames Police Court, by Mr. Charles Watkins, of Ingram House, Fenchurch-street, surveyor and builder, to show cause why a "notice of objection" served by Mr. Crow under Sec. 150 of the London Building Act, 1894, should not be disallowed. Mr. T. Seager Berry, of the Solicitor's department, L.C.C., in opening the case for the District Surveyor, stated that the object of the section under which the notice of objection was served was to enable a magistrate's decision to be obtained on any question arising under the Act before the work was commenced, so as to avoid the inconvenience and loss which have often accrued in the past through the District Surveyor not being able to take proceedings until the work in question had been begun, and an offence actually committed. The facts in this case were simple, and not disputed. In November last two warehouses, Nos. 1 and 3, Church-street, Minorities, were involved in a conflagration which destroyed several buildings in the neighbourhood. No. 3 was almost a total ruin, considerably more than half of the cube thereof being either burnt or pulled down. The damage to No. 1 was slight, but under a dangerous structure notice the party-wall between the two warehouses was pulled down to the extent of about one-third of its superficial area. On January 21 the District Surveyor received notice from the builder for the reinstatement of the party-wall. This notice referred only to the wall in question, which was therein styled the "party-wall" of No. 1, no notice having been received for the reinstatement of No. 3. Thereupon the District Surveyor served the builder with a notice of objection, on the ground that the lower portion of the party-wall—which he described as being situated between Nos. 1 and 3, Church-street—was of insufficient thickness, and constructed with improper mortar. It was urged in support of the notice of objection, that inasmuch as the wall in question was a party-wall, and thus formed part of No. 3 as well as No. 1, it must be made to comply with the new Act, for No. 3, having been burnt down or destroyed to the extent of more than half its cube, the reinstatement thereof would by Section 5, Sub-section 6, be considered as the erection of a new building, and the walls must be made of the thickness required by the first schedule.

The facts having been briefly proved by the District Surveyor, and Mr. W. C. Young, Public Analyst for Whitechapel, who stated that the mortar originally contained only one part of lime to 7½ of broken brick, sand, and dirt, Mr. Morris, on behalf of Mr. Watkins, contended that Sec. 208, which deals with party-walls, only requires the remaining portion of any party-wall to be made in conformity with the Act if more than half of its superficial area has been taken down, burnt, or destroyed, which was admitted not to be the case with the wall in question, and that, therefore, it was competent for his client to reinstate the wall under the old Act.

Mr. Berry, in reply, contended that Sec. 208 only purported to govern a party or external wall *per se*, and did not affect the obligation imposed on the

(Sanitary Officers).—Inspection and demonstration of:

SLATES.
SOLE IMPORTERS.

ILLUSTRATIONS.

Paris Exhibition of 1900: One of the Three Premiated Designs.—By M. Girault, Architect	Double-Page Ink Photo.
Restoration of Chancel, Hambleton Church, Rutland.—Mr. J. T. Lee, F.R.I.B.A., Architect	Double-Page Ink Photo.
Billiard Room, "Blawith," Grange-over-Sands.—Messrs. Willink & Thicknesse, Architects	Single-Page Ink Photo.
Principal Entrance, County Council Offices, Wakefield.—Messrs. Gibson & Russell, Architects	Single-Page Ink Photo.
Garden Front of a House at Enfield.—Mr. T. W. Cutler, F.R.I.B.A., Architect	Single-Page Photo-Litho.
Design for Framlingham Grammar School.—Mr. W. D. Gravell, A.R.I.B.A., Architect	Single-Page Photo-Litho.

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Sodium, and the St. Pancras Explosions.

THE origin of the recent explosions in street boxes used in connexion with the electrical supply of the St. Pancras district has at length been traced to its source—at least, an explanation of the matter has now been offered by Major Cardew, the electrical adviser of the Board of Trade, which most scientists would admit as a very reasonable one in view of the facts ascertained. He has discovered a remarkable deposit on some of the insulators, which, on investigation, was found to contain a considerable quantity of the metal sodium. This metal, under certain conditions, becomes highly inflammable on contact with water, and it is believed that on ignition it fired the escaped coal-gas found in the street-boxes, hence the explosions. Sir Courtenay Boyle, on behalf of the Board of Trade, states that it devolves upon his Department, without delay, to investigate the causes of the deposit of the sodium with a view to its prevention. The matter is, in official circles, regarded as of such a pressing nature and to present such difficulty from a scientific point of view that the assistance of the Royal Society and of the Institution of Electrical Engineers was at once invoked on the discovery being made. The Board of Trade has apparently made up its mind that other similar explosions that have recently happened in the metropolis are due to the same cause, and their prompt action is to be highly commended.

In the meantime, in order to prevent, as far as possible, the recurrence of explosions, the Board of Trade strongly urged the St. Pancras Vestry to provide a thorough system of ventilation for the conduits and street boxes, to reduce the space in the boxes within which an accumulation of gas could occur, and to make a thorough inspection of the mains, and remove the deposit from the insulators wherever it was found to exist. This has now been done, so far as the St. Pancras district is concerned, but we do not gather that other Metropolitan bodies in charge of electric lighting arrangements have been counselled to do likewise, so that

the danger still lurks in our midst pending the inquiry of the scientists concerned, which may be a very protracted one.

This seems a seasonable opportunity to make a few remarks on sodium, the special properties of which do not seem to be generally understood, though it would naturally be impossible, except by means of a very tedious and careful examination, to throw much light on the actual cause of its deposition on the insulators referred to. Sodium is a chemical element; but it occurs nowhere in nature in an uncombined condition. It was first discovered by Sir Humphry Davy, almost immediately after that celebrated man had discovered potassium, and by the same means, viz., by exposing a piece of moistened hydrate of soda to the action of a powerful voltaic battery, the alkali being put between a pair of platinum plates connected with the battery.

When placed upon the surface of cold water it decomposes it with violence, but does not ignite the hydrogen liberated, unless the motion of the sodium be restrained, when the cooling effect is much less; but the hydrogen is lighted on the sodium being placed in hot water. In a state of rest, on the application of water, the reaction is more dangerous than the corresponding phenomena developed by potassium, because it frequently leads to most violent explosions. This point is to be especially noticed. The metal does not affect carbonic oxide at any temperature. Its fusing-point is 95.6°C.; specific gravity .98; before the blowpipe it gives a strong yellow flame. When pure it is of a silver-white (almost white) tint, and is so soft at ordinary temperatures that it may be easily cut with a knife, or pressed between the finger and thumb; whilst it oxidises rapidly in the air.

Sodium combined with silica is present in small quantity in most silicates. In union with chlorine, as common salt, it is the most important mineral ingredient of sea-water, and can be detected in minute quantities in air, rain and river water. As might naturally be supposed, it is, as a constituent of the atmosphere, more abundant on or near the sea-coast than inland. The proportion in London air is so minute that the deposit on the insulators can hardly have been derived from that source.

Metallic sodium was for years manufac-

tured by reducing sodium carbonate, or soda ash, by means of charcoal or other form of carbon. It is used in the preparation of aluminium, magnesium, boron and silicon. By the invention of what is known as the Castner process a new method came into existence. This consists in reducing either the hydrate or the carbonate of sodium in a fused state by means of "carbide" of iron or its equivalent, a mechanical mixture of carbon and iron so intimate that the two substances can be separated only by aid of acids, or intense heat. In the Minet process of producing aluminium, a mixture of the fluoride of aluminium and sodium together with the chloride of sodium is submitted to the influence of the electric current. On this, the sodium fluoride undergoes decomposition by the action of the electric current yielding up its sodium by interaction with the aluminium fluoride present, thus causing the liberation of an equivalent of aluminium and re-forming sodium fluoride. The metal, cast into the form of cakes, or ingots, is protected from the air by a coating of paraffin, and secured in closely-fitting soldered-up tinned-iron boxes, and in other ways.

From the foregoing it will be seen that sodium, like other chemical elements, may be derived from its compounds by the application of electricity; and, indeed, that was how it was first discovered. Then, it will be noticed that under certain circumstances on being introduced to water it causes violent explosions. If the presence of gas had not been ascertained to have existed in the street inspection boxes, and the insulators had a thick coating of the metal, minor explosions might well have been attributed to the explosive action of the sodium alone. We have no means of ascertaining the precise amount of the metal which was proved to occur, so it is difficult to form any definite opinion. No doubt, the Board of Trade will publish full particulars concerning that later on. Inquiry should, we think, be directed, in the first place, to the precise nature of the insulators. In the preparation of porcelain goods of a certain class it is customary to glaze the exterior by the application of common salt; the chloride might indirectly have provided some of the sodium in presence of a very powerful electric current. If dirt had been allowed to accumulate to any extent this also might have been partly responsible; the actual

composition of the electric mains themselves might show that adulteration had been at work; but these are mere suggestions which a careful enquiry would at once set at rest.

The Board of Trade has promised the Vestry to let them know, without delay, what to do to mitigate the evil, but that must, of course, depend on the success, or otherwise, of the investigations in progress. The Vestry Committee, by way of retort, it would almost seem, expressed a hope that the Government department would bring pressure to bear on the gas company to remedy the defective state of gas mains and services in their district, and thus remove the primary cause of the explosions.

CREWE INFECTIOUS DISEASES HOSPITAL COMPETITION.

AS stated in our last issue, the first premium in this competition has been awarded to Mr. George Bolshaw, of Southport, and the second to Mr. E. Harding Payne, of London, but, after inspecting the drawings, we cannot endorse the decision, as there are, in our opinion, several vital defects in the first premiated design.* The site is an irregularly shaped, approximately rectangular plot, about twice as long on the north and south sides as on the east and west. Roads are proposed on the west and south sides. The promoters have unwisely laid stress on the provision of space for future extension, although the site is really only sufficient for an infectious hospital of the size at present contemplated—that is, thirty beds—if due safeguards are to be observed. The first premiated design shows an apparent capability for future extension superior to any other, but this is only done by first ignoring the desirable rule of a non-infected zone 40 ft. wide around the site, and secondly, by making the long side of the wards face almost due south and north, instead of east and west. Thus the scarlet-fever block, although the main walls are 40 ft. from the road, has its small one-bed wards projecting till they are only 24 ft. from the road, whilst the typhoid block is within 30 ft. from the site boundary, and the observation wards are 4 ft. only from the boundary, and their offices 12 ft. from the road. After the recent discussion at the Institute, and the opinions then expressed by the leading experts in hospital construction, it is almost amusing to find that the author of the first premiated design is sanguine enough to hope that he can build an infectious hospital for thirty patients for 5,250*l.*, just half of the estimate of the second premiated competitor.

The sub-division of the thirty beds appears to have been left to the competitors, and Mr. Bolshaw provides for nine men and eleven women in his scarlet-fever block, four men and four women in his typhoid wards, and two beds in the observation wards. The plan of the scarlet-fever block is based on the now well-known arrangement, which gives one nurse's duty room overlooking four wards. The typhoid wards are, of course, simple enough, and generally there is little fault to be found with the detailed arrangement of the various buildings until we come to the laundry block, where we find the discharge rooms part of the same building and next to the infected van house. After leaving the discharge rooms, the cured patient in his own clothes must pass the scarlet-fever pavilion or the mortuary on his way out. The author provides 156 ft. superficial, 12 ft. lineal of wall, and 2,028 ft. cube to each patient in the large wards; 171 ft. superficial and 2,052 ft. cube in single bed wards; and 180 ft. superficial and 2,160 ft. cube in the observation wards. No covered ways are shown between blocks.

In the second premiated design a far better general arrangement is shown on the

site plan, the buildings are sufficiently removed from the boundaries, the wards have the right aspect, and space is provided for future extension, but the author rightly advises that it should only be used on emergencies for a temporary or tent hospital. The accommodation is arranged for seven men and nine women in the scarlet-fever block, five men and seven women in the typhoid block, and two beds in the observation wards. The type of ward unit adopted is the same as in the first premiated design, and all the details are well arranged. The discharge rooms are rightly made a distinct block and near the entrance, so that after assuming his own clothes a patient would not be exposed to the chance of re-infection. The author suggests covered ways, but disconnects them where they cross, and thus effects a good compromise between the divergent views.

We have no hesitation in expressing our opinion that the Borough of Crewe would be more wisely served by the erection of the second than of the first premiated design. The land adjoining the proposed site belongs to the Corporation, and it would be greater economy in the long run to reserve additional land for future extension, instead of committing a serious present error, to be intensified in the future.

Of the remaining sixty-one designs there are many which show a sound knowledge of the requirements of an infectious hospital, and we regret that our space does not permit us to notice more than a very few. The design marked with "Red Maltese Cross in Circle," is one of the best submitted. No provision is made on the site for future extension, and thus the author has been able to produce a good general plan, and to give the right aspect to his wards.

Several competitors have endeavoured to overcome the disadvantages of the ward type adopted in both the premiated designs, as although this effects the desirable economy in a small hospital of making one duty room overlook four wards, there is the drawback that one patient in each of the larger wards is placed in a comparatively dark and badly ventilated corner, and, as we once heard an experienced hospital doctor express it, "these patients have a bad habit of popping off the hooks when one is not looking." "Light and Air Everywhere" provides two duty rooms for twelve patients in four wards in his detail of a good general plan. "Red Cross on Shield" has also a good general plan, but in his ward unit errs on the side of extravagance in sanitary adjuncts; thus the typhoid block, with twelve patients and one nurse's duty room, has five water-closets, five lavatories, and three bath-rooms. This competitor evidently takes the view, for which a good deal is to be said, that the nurse's place is not in the duty room but in the wards. "Xpert" has a good ward type, the duty room overlooking the two larger wards and the single bed wards being at the opposite end. "Hit" has a well-prepared set of drawings, but his arrangement is costly and even extravagant, as the thirty beds are provided in two wards of six beds, three of three beds and no less than seven single bed wards. We fail to see the advantage, too, of planning a three-bed ward with beds on the long side against a blank wall and windows only at the ends. The ward must be at least 36 ft. long, and the poor patient in the middle would surely come off badly for light and air.

NOTES.

THE result of the County Council election has been satisfactory. The inhabitants of London have shown that they desire efficient and economical administration within the existing powers of the Council. This is a thoroughly common-sense view, and exemplifies again the sound sense which characterises the English people. Such conduct, for example, as a pedantic adherence to the principle of betterment, a short-sighted determination not to undertake improvements

unless in exactly the way which seemed to the Council to be right, has been clearly condemned. Long debates on the unification of London again have seemed to the voters altogether unbusinesslike, as has such a thing as the painting of Hammersmith Bridge at an unsuitable season of the year, and, consequently, at a greater cost to the ratepayers, in order that some workmen might be employed in the dull season. On the other hand, the evenness of the two parties will prevent anything like a sacrifice of efficiency to economy. We do not for a moment believe that the ratepayers wish to avoid the spending of money if the object is business-like and to their interest, but they certainly desire to have the principle kept clearly and continuously in view, that the Council are trustees and agents for the whole body of inhabitants of London, and are not to sacrifice the general interest to that of some particular section.

THE Home Secretary last week introduced into the House of Commons an important Bill to amend the Factories and Workshops' Act. Without in anyway going into details we may point out that it extends the operation of the existing Act by including laundries and bakehouses, and, what is more important to many of our readers, "building operations where machinery is employed." We quote from the Home Secretary's speech, but the latter extension though, in some respects desirable, will require careful consideration so as not to be too irksome to employers. In some respects, perhaps, the most important alteration is the creation of a standard by which overcrowding in a factory may be judged. The Bill enacts that in every factory there shall be a minimum of 250 cubic feet of space to every person, and 400 cubic feet of space during overtime. In other words, not more than some half the persons who work in a factory in ordinary hours are to work during overtime. There are also various provisions as to fire escapes, fencing of machinery, and the non-employment of young persons in the cleaning of it, and other changes not unimportant but less noticeable than those which we have noted above. The Bill is undoubtedly a considerable advance on previous legislation, and it cannot be denied that though in some instances it will increase the burden already placed on employers of labour, yet that on the whole its provisions are such as cannot be objected to by reasonable men. When Mr. Asquith points out, for example, the unhealthiness of laundries, and the unduly long hours of labour in some of these places, we feel that this inclusion is a step in the right direction. The Bill is based on experience, and it is to be hoped that in the heat of party conflicts it may not be submerged during the course of the present session.

COMMERCIAL legislation frequently seems fated to fall to the ground after progressing a few stages, and in spite of several more or less energetic attempts to legislate upon trade disputes, we are still without a General Trades Conciliation Act. The introduction of Mr. Bryce's new Bill this week, marks another stage in the history of Parliamentary action with regard to this important question. The measure gives the Board of Trade a legal right to make inquiries into the causes of trade disputes, and to further facilitate the formation of Conciliation Boards. It is also proposed to empower Borough and County Councils to create District Boards, certain special powers being committed to such bodies in order to render their work effective. Arbitration does not figure very largely—indeed, it may be described as a cautious and somewhat unassuming measure. Mr. William Allan, M.P., in the course of the debate on the first reading of the Bill, boldly advocated the appointment of two "trade judges" to deal with trade disputes, but the Government are not likely to adopt this suggestion. If a good

* See, in connexion with this subject, the letter and report of the assessor in the competition, printed in our correspondence column.

workable measure can be framed with conciliation for the key-note, and an arrangement to fall back upon which would ensure the introduction of disputants to an approved arbitrator, it would certainly merit general support.

FOR the last two or three years the Mersey and Irwell Joint Committee has been doing its utmost to put a stop to the pollution of the rivers under its control. Numerous actions have been brought against manufacturers, local boards, and corporations, but progress has been slow. The parties interested appear, with one consent, to have thrown as many obstacles as they could in the way of the Committee, and the dilatoriness of the Local Government Board in holding inquiries, passing schemes, and granting borrowing powers, has added to the difficulties of the Committee's work. And now the work has received another check. The Joint Committee brought an action against the Salford Corporation for allowing solid or liquid sewage to enter the river Irwell and the Ship Canal. The action was really brought to prevent the further pollution of the Ship Canal, which, at the point in question, had taken the place of the river. Judge Parry, in delivering judgment, declared that the evidence of pollution was "overwhelming"; he had not, however, relied wholly on chemical or other evidence, but had seen and smelt for himself; he could not see (he added) how anyone, "not being a chemist and a witness" (!), smelling the smell and seeing the scene, could come to any conclusion but that the effluent was unwholesome, noxious, and polluting, and that it was liquid sewage matter within the meaning of Section 3 of the Rivers Pollution Act, 1876. And yet he was compelled to give judgment in favour of the offending Corporation, because the Canal was not a river within the meaning of the Act. To mark his disapprobation of the defendants' course of action, he ordered them to pay their own costs. We are glad to learn that the Joint Committee proposes to appeal against the decision, but it is to be hoped that the Lancashire County Council, which has an undoubted right of action in the matter, will at once take proceedings against the Corporation, so that residents along the banks of the Canal should not again have to breathe such pestiferous exhalations as characterised it last summer.

WE understand that a recently-formed limited liability company is about to work the Cove-Kirkpatrick Stone Quarries, Carlisle, on a large scale, and a few words on the matter may not be out of place. They are situated on the Cove estate, about a mile from Kirkpatrick station, Dumfriesshire, fourteen miles from Carlisle, and about two miles from the celebrated Corsehill quarries. The stone exploited is of two tints, red and yellowish-white; they are described as sandstones, though we have been unable to secure specimens for examination. From the following chemical analyses made some two months since on samples from which the hygroscopic moisture had been expelled, there is very little doubt of their being correctly designated, however.—

	Red stone.	Yellow stone.
Silica	83.516	86.113
Alumina	4.374	3.821
Peroxide of Iron.....	3.660	3.020
Lime	1.530	1.393
Magnesia.....	.412	.342
Potash, &c.	2.521	2.503
Water	1.274	.857
Carbonic acid.....	1.368	.456
Loss, &c.	1.345	1.485

It is of very little use to attempt an explanation of these analyses from a practical point of view, as they are not accompanied by a description of the mineral character of the stones as seen in thin sections under the microscope. Thus it is impossible for anyone to state how much of the silica exists in the form of sand grains or how far that oxide may act as a cementing material—

points of much importance. Then, if the alumina is simply entering into the composition of felspathic matter we have no objection to seeing from 4 to 5 per cent. of it in these stones; but if, on the other hand, it is there in the form of clay, we should not think much of them. Without these two points being satisfactorily cleared up it is not possible to estimate the value of the analyses, any explanation of which must, to a large extent, be pure conjecture on the part of a chemist, without the aid of the petrologist. As they stand, the analyses might well refer to the chemical composition of two handfuls of quartzose sand. To a certain extent, however, some light is thrown on the matter by the experiments made as to thrusting stress, from which we observe that the light yellow stone crushed under a varying load of from 467.3 tons to 557.5 tons per square ft.; whilst the red stone crushed at from 418.6 tons to 461.4 tons per square ft. The range of variation is not great for this class of stone, and seems to indicate that the materials are of pretty even quality. These figures show that the Cove stones are quite as strong as those from the Corsehill quarries, which crush at from 341.6 tons to 579.6 tons per square ft.; and they are superior in this respect to many other well-known sandstones of approved durability. The value of these chemical and physical experiments would have been greatly enhanced had they been accompanied by detailed particulars as to the absorptive properties of the stones to which they refer. On the whole, so far as we are enabled to judge from the information laid before us, we should say that the Cove-Kirkpatrick stones are of very fair quality.

THE lecture on vaulting given on Monday by Mr. Arnold B. Mitchell at the meeting of the A.A. Camera Club was confined to the consideration of English vaulting, illustrated by lantern views, many being of considerable beauty and architectural value. A view of the Angel Choir of Lincoln, showing a near group of capitals and the distant vaulting to great advantage, was particularly successful. Exception might be taken to a greatly distorted view of the fan vaulting, King's College Chapel, which, though perhaps conducive to study of the vault, is scarcely to be recommended as a proper illustration of the subject. Of the other views it may be said they were carefully selected and superior to the usual professional photographer's series. It would have been better had some mention been made of French and Spanish vaulting. No illustration was given of either kind, though some interesting and complicated foreign examples might profitably have been introduced by way of contrast to English work, and as illustrative of the methods adopted by foreign architects, contemporary with the English, whose work Mr. Mitchell—properly in most instances—claims to be superior in thoughtful simplicity and continuity of purpose. That stone vaulting was, during the Norman period, the favourite method of ceiling is by no means disproved by the rarity of stone vaults of large span. The builders of Ely, for instance, certainly intended to so cover both nave and aisles; the abrupt finish of the shafts under the wooden ceiling clearly indicates this. The attempt in other cases also was abandoned owing to the insufficiency of the supporting walls, not from lack of skill in dealing with vaulting problems. The irregular surface of the filling in of Norman and Transitional vaults is due to the way in which the stones were packed together without centring, or, at least, as Professor Willis says, with a very rude framework. A centre built up solid is by no means reconcilable with the usual appearance of this filling in. Mr. Mitchell claimed to have discovered that the latter method had been adopted at St. Bartholomew's the Great; but the point was hardly made clear. In the arcade of the Chapter House at Salisbury is a carving representing what may supposed

to be the building of the Tower of Babel; from that Mr. Mitchell deduced that only such stones as could be carried by a man on his back were used in early vaulting, hence the smallness of the stones. We were pleased to hear Mr. Mitchell condemn the growing practice of putting faith in the architectural photograph, greatly, it is to be feared, to the neglect of the older faith in intelligent sketching and close study of detail.

MANY architects will have heard with regret of the death of Canon Venables (or, as he was often called, Precentor Venables), of Lincoln, who was an enthusiast in regard to Mediaeval church architecture, and possessed a great deal of archaeological knowledge in reference to monastic buildings. Members of the Architectural Association who can remember the first annual excursion to Lincoln and its neighbourhood, under the guidance of Edmund Sharpe, will not have forgotten the almost boyish enthusiasm with which Canon Venables joined in the proceedings. He was identified in sympathy with the Gothic revival and the church building movement of the earlier part of the century, and retained his old predilections and habits of thought about Mediaeval architecture to the last. He was an occasional contributor to our columns, both in his own name and anonymously, the latter mainly in the form of accounts of some excursions of Archaeological Societies at which he was present.

GLASGOW is noted for its theatre fires.

There have been nine since 1829, besides three circus fires. The conflagration at the Theatre Royal on the 1st inst. was one of the most instructive, as it clearly showed how dangerous some concrete floors can be, and to what extent cast-iron columns, if properly set up, will resist high temperatures without being affected. The fire also showed to what a degree wood-work can become inflammable tinder in buildings of this kind. As to the concrete corridor floors, pugged wood would certainly have been safer. They could not be used for localising the fire in the auditorium, as they were too unreliable for the firemen to work on, or under. The difference of temperature and the falling of small weights easily wrecked them, though they were $7\frac{1}{2}$ in. thick to an average span of about 6 ft. 6 in. As to the cast-iron supports, in several instances as many as three columns, bolted one over another and fixed to a good base, remained in position whilst everything around them was totally destroyed. The wood-work, of which there was too much in the building, burnt furiously and rapidly, the auditorium and stage being gutted in a marvellously short time. The wood-work was reduced to ashes in a way seldom seen at ordinary fires. The walls, which were of masonry, withstood the flames well, and will probably be re-used. As to the size of the building, which has already been burnt down in 1879, and then rebuilt by Mr. Phipps, we understand it to have seating capacity for nearly 3,000. The stage was 72 ft. by 50 ft., the proscenium opening 32 ft. On examining the plans, we think it fortunate the fire did not occur during a performance. We would only add a word of praise for Captain Paterson and his brigade. He handled them admirably, preventing any appreciable spread to the neighbouring property.

SINCE Robert Davidson propelled a car on the Edinburgh and Glasgow Railway by an electro-magnetic engine and galvanic batteries in 1837, wonderfully little progress has been made in the application of electricity to steam railways. It is only this year that electric locomotives seem to have got beyond their experimental stage. In France, the Compagnie de l'Ouest, after trials extending over nine months, have given orders to rent two Heilmann electric locomotives, which are to be of 1,500 h.p. each, and capable of hauling 200 tons at a speed of 60 miles an hour. They are to be engaged by Messrs. Willans & Robinson,

of Thames Ditton. The locomotive, described briefly, is made up of a steam-engine, dynamo, and motors, on a large truck, the dynamo and motors coming between the steam-engine and the axles. One of its recommendations is that all secondary vibrations due to the motion of the piston are absent, and so "pitching" and "galloping" are avoided. Still what it practically comes to is that the locomotive has to carry its own electric central station on its back, and it is very doubtful whether it will ever prove a formidable rival to our present locomotives. In America, the introduction of electric locomotives on the Baltimore and Ohio Railway at the Belt Line Tunnel seems to be the beginning of a new departure in railway engineering, and will be watched with interest by the general public. It is the first important step in the adoption of electricity on steam-roads. The railway motors are the largest in the world, and are designed for heavy work. In testing one of these motors, a New York Central heavy six-wheeled engine was coupled to the electric locomotive truck. The machines were then sent in opposite directions, and tugged at the connecting coupling as in a tug of war. The electric motor pulled the heavy locomotive up and down the track with apparent ease. One great advantage of these motors is that their pull is constant throughout, and so there is never any difficulty in starting. In ordinary steam locomotives there is, of course, a varying strength of pull due to the position of the crank. The Baltimore Belt Line Tunnel is expected to be opened by the beginning of April, and the operation of these heavy motors pulling trains through a tunnel, kept free from smoke, well ventilated and brilliantly lighted by electric lamps, has every chance of being a commercial success.

IT is satisfactory to find from the statement of the Chairman of the Metropolitan District Railway that the automatic station-indicator has proved to be capable of practical application, and that it is the intention of this company to begin forthwith to use it. There is no question that it will remove a great drawback to travelling on the underground lines, when it is often quite impossible to know in a carriage at what station the train is stopping. But it is equally clear that the use of the indicator should be made obligatory on all suburban lines, and we can see no reason why the Board of Trade, if it comes into general use in the carriages of the Metropolitan District Company, should not insist that it be used on other lines. It may, however, be fairly asked why improvements on the underground lines are to stop at the employment of a station-indicator. Why should not the stations be properly lighted and ventilated, the destinations of the trains be larger and more readable, and lighted so that they may be ascertainable in the stations at night or on dark days? In truth, a number of small improvements might be accomplished for the benefit of travellers on the underground lines, which seem to be entirely overlooked.

IN a communication to *Der Civilingenieur* Mr. A. Föppl gives some interesting particulars of the history of the truss. The modern truss, he says, originated about sixty years ago, and was due to two discoveries: first, that a rigid figure in the plane is produced by joining triangles together; secondly, that if a system of bars thus composed is loaded, there are mainly only tensile and compressive stresses in the bars. The triangulated systems of the Romans and Egyptians indicate that the first theorem was known in their days; but the introduction of members with bending stresses, different from those caused by rigid connexions, shows that the second theorem was not fully realised. The first trusses in the modern sense were the English and German roof-trusses, and the American bridge-truss. The theoretical definition of

stresses began about 1839, and has been brought to a conclusion with the theories of the statically undetermined truss, by Mohr, and of the secondary stresses, by Manderla. The author states that improvements will be made, but there will be no more surprising discoveries; though there is still much room for improvement in the application of the above theorem to trusses which, as in the case of roofs or bridges, are two or more trusses braced together, but are generally treated as combinations of plane trusses. The paper deals with the investigations in this field of Schwedler, for uniform loads, and to his own subsequent work in solving the problem for irregular loads.

ST. THOMAS'S HOSPITAL (in respect of which an appeal for 100,000*l.* has recently been made to the public) was built in 1866-71, after the designs of Mr. Henry Currey, architect and surveyor to the Hospital Governors. The site, about 83 acres, nearly one half of which had been reclaimed from the river fore-shore, was purchased from the late Metropolitan Board of Works for 90,000*l.* The governing body adopted the detached-pavilion system—extended on one line through the exigencies of the position, after a committee had visited many hospitals on the Continent. With a total frontage of 900 ft. the blocks stand 125 ft. apart: the central space being 200 ft. They were designed for 600 beds in wards measuring 28 ft. by 120 ft., and 15 ft. high, for 28 beds a-piece, giving each patient a space of 1,800 cubic feet. In giving evidence before the Hospitals Commission, February, 1891, Mr. Brass, receiver of the estates, is reported to have stated that the buildings on the Albert Embankment cost 969*l.* per bed, the out-patients' side included; and that whilst the London property then yielded 31,655*l.* per annum and was increasing in value, the income derived from country estates had fallen from 17,347*l.* a year, in 1880, to 14,000*l.* in 1890. But 296,000*l.* had been obtained for the site in the Borough, taken instead of St. Saviour's Church, in 1861, upon the award of Mr. Stewart, of Liverpool, in arbitration between the railway company (Charing Cross to London Bridge), who offered 145,000*l.*, and the Governors, who asked 478,000*l.* Until the Suppression this hospital, then valued at 266*l.* 17*s.* 6*d.* yearly, had been a religious foundation dedicated to St. Thomas of Canterbury. It originated in a house of charity which, with Amicius, Archdeacon of Surrey, for warden, was standing before 1213, within the precincts of St. Mary Overey. After the great fire there in 1212 the canons opened on the east side of the Borough a temporary hospital to which Peter de Rupibus, Bishop of Winchester, joined a neighbouring almshouse founded for converts and poor children (1213) by Richard, Prior of Bermondsey. "Bekket's Spytell," also called the Hospital of Holy Trinity, was given by Edward VI. on their petition "for poor impotent and lame persons" to the City Corporation, who re-named it, in 1553, as the Hospital of St. Thomas the Apostle. As rebuilt in 1707-8, and enlarged in 1717 and 1732, the three courts lay behind the north side of St. Thomas's-street, wherein the parish church and the treasurer's (former) house formed the south side of the middle court: the third court, Sir Robert Clayton's, stood on the old site. The north and south wings of the first court, entered from High-street, were built respectively with the donations of Thomas Guy and Thomas Frederick; the main entrance gates and lodges, with the two wings, were afterwards rebuilt of stone, from James Field's designs. Guy built his own hospital on a plot of land, south side of St. Thomas's-street, leased from the Governors of St. Thomas's, for 999 years at a ground-rent of 30*l.* per annum. Within the precincts of St. Thomas-in-the-Close, which was a sanctuary and formed the

parish, lived James Nicolson, who there printed the first complete English Bible (Coverdale's); and also some renowned glass-painters, whom we mentioned in a "Note" of January 6 last year. We published Mr. Currey's designs in 1865 and 1871.*

THE Forty Hall estate, Middlesex, is placed in the market. The house, distant within a mile northwards from Enfield, was built in 1629-32, for Sir Nicholas Raynton, and reputedly after Inigo Jones's designs, which include the stable gates. In the church is the monument of Sir Nicholas, *obit* 1646, with effigies of him and his wife. He is in armour, and wears his chain and robe as Lord Mayor of London, 1632-3. Raynton bought the old manor of Worcesters, *prius* Wroth's Place, and a neighbouring house which a survey of 1635 describes as some time Hugh Fortesc's, but latterly Sir Thomas Gournes's. On the union of the two estates Forty Hall was regarded as the manor-house. The house he built was repaired and modernised by the Wolstenholmes in 1700. Eliab Breton married the heiress of the Raynton and Wolstenholme families. In 1787, two years after his death, the Enfield property, one of the most compact in the county, and comprising 1,800 acres of the ancient forest, was sold, by his son Harvey Breton, for 50,000*l.*, in several lots. A Mr. E. Armstrong bought the Hall and 150 acres, lying within a bend of the New River, for 8,800*l.*; they were afterwards purchased by Mr. James Meyer, who enlarged the estate to about 300 acres. Mr. Edward Ford, in his "History of Enfield," a privately-printed volume (1873), gives two good views of Forty Hall and the stable-gateway; he speaks of the beautiful traceried work in some of the ceilings, with the figures "1629," "1632" upon some of the bricks and leaden piping. According to a local tradition, it was in one of the walks at Forty Hall, alongside of the Maidenbridge brook, that Raleigh laid down his cloak beneath Elizabeth's feet. The Queen was then staying at Elsyng Hall, which Norden says was built by an Earl of Worcester. The old Manor-house of Enfield, long known as the Palace, where Elizabeth often resided, both before and after her accession, was alienated from the Crown by Charles I. His successor bestowed upon General Monk the Palace home-park, latterly known as Old Park.

"WOODS" HOTEL, in Farnival's-inn, Holborn, has been demolished, the property having been acquired, we understand, by the Prudential Assurance Company from the Society of Lincoln's Inn by purchase. The demolition extends to three houses in Greville-street at the rear, and one in Leather-lane, to which latter street a part of the hotel buildings also have a frontage. The Inn and the hotel were built in 1818, by Henry Peto—whose statue (1830) is in the square—and in 1883-4 the hotel, of which Woods was proprietor during fifty years, was enlarged with additional rooms erected, after the designs of Messrs. Isaacs & Florence, on the site of two or three houses in Greville-street; three years afterwards the Assurance Company extended their premises by taking adjacent sites in Brooke- and Greville-streets: Mr. Alfred Waterhouse, R.A., being their architect. The old Inn, excepting its Hall, was pulled down and rebuilt *templ.* Charles I.; its Holborn front, of fine brickwork, with pilasters, has been attributed to Inigo Jones. The Hall, which remained until 1818, had over its door, facing south, a tablet inscribed "E P C 1688." Stow mentions a Sir William Farnival, Knt., as seized of two messuages and thirteen shops in Holborn, in 6 Ric. II. That property passed to Thomas Nevill, younger brother of Ralph, Earl of Westmoreland, on his marriage

* For some particulars of his plans we are indebted to a paper he read at a meeting of the Royal Institute, and printed in our columns on January 28, 1871.

with Joan, daughter of William, Lord Furnival. Their eldest daughter and co-heir, Maud, married the redoubtable Sir John Talbot who was summoned to Parliament in 1409 as "Johannes Talbot de Furnyval," and was created, 1442, Earl of Shrewsbury. Their descendant, Francis, fifth Earl, sold it for 120*l.*, by a deed dated 16 Dec., 1 Ed. VI., to Edward Gryffyn, Solicitor-General, and others, "to the use of the Society of Lincoln's Inn"; but Herbert* tells us that Furnival's Inn is first noticed as a law seminary in its steward's account-book, written circa 9 Henr. IV., and that Lincoln's Inn granted a lease at 3*l.* 6*s.* 8*d.* yearly to the principal and fellows of Furnival's Inn. He also says:—

The hall is seen on entering the gateway. . . . It is a low plain brick building, with a small turret, and two large projecting bow windows at the west end.

. . . Its dimensions are 40 ft. by 24 ft. The roof is of timber, arched, and divided into panels by ribs springing from the sides; but it is very plain and poor compared with others of a similar kind.

His volume contains plates of the hall interior and exterior, and of the main façade. Sir Thomas More was reader here for three years and longer. The arms of the Inn were, argent a bend between six martlets gules (Furnival of Hertfordshire) within a border of the second. Charles Dickens lived or awhile at No. 12; the rooms he occupied or some period after his marriage, and where Thackeray called upon him with a proposal to illustrate "Pickwick," are at No. 15, on the third floor.

SOME of the members of the Cardiff, South Wales and Monmouthshire Architectural Society appear to have been engaging in a line of action which is very unprofessional and very discreditable to them. Mr. Seward, who is a leading architect in Cardiff, and was till a few weeks since President of the above-named Society, was commissioned by the Cardiff Corporation in 1890 to prepare plans for the extension of the Free Library, Museum, and Art Gallery, the original buildings of which had been erected by him in 1881, he having been appointed architect for them as the result of a competition. A delay of two years occurred, after which it was proposed to remove the Museum and Art Gallery to another site, a scheme which Mr. Seward approved of, but the library alone was proceeded with, and is now approaching completion from his designs, and it was understood that he would be commissioned to carry out the museum and art gallery whenever a fitting site was obtained. This has now been done, and Mr. Seward, at the request of the Corporation, had reported on the site and sketched some alternative plans, when the Society, of which till almost up to that moment he had been President, addressed to the Corporation a demand for a competition; in other words, to take the building out of the hands of the architect who had carried out all the other parts of the scheme, and had already been officially concerned in connexion with the new portion, and throw it open to them. Anything in worse taste can hardly be imagined. The matter seems now, from the Cardiff papers, to be in hot debate, and it is to be hoped that the Corporation will stand by their architect.

WE have seen better exhibitions of "the Painter-Etchers" than the one now open at the rooms of the Water-Colour Society, but it contains many things worth looking at, and it shows the usual contrasts between the free style proper to etching, and the elaborate working up which is rather to be called engraving. The proportion of these latter is, however, less than in some former years. Mr. Cameron and Mr. Short are admirable for their carefully-considered line sketches, especially the latter artist's

"King's Lynn" (23). Mr. Holroyd's "Icarus" series shows a great deal of imaginative power. Some of the architectural subjects, such as Mr. Burgess' "Peterborough Cathedral" (92), suffer from being overworked, and in Mr. C. O. Murray's "Staircase, Christ Church, Oxford," the heavy treatment of the vaulting ribs makes them stand out with a kind of spider's-web appearance, the surfaces between them being entirely killed. Mr. Axel Haig is represented by several etchings; Mr. Goff's series are exceedingly good—etching of the right school, as also those of Mr. Crawford and Mr. Percy Robertson. Mr. Legros sends some works remarkable for their power and originality, notably "Ruine d'Ancien Aqueduc" (210), "Coin de Bois" (216), and "Le Triomphe de la Mort" (221).

THE collection of water-colour drawings of "Gardens of Many Lands," by Mr. Elgood, now on view at the Fine Art Society's Gallery, is charming almost from first to last, both for the merits of the drawings and the varied interest of the beautiful garden scenes represented. Among those that are specially good or interesting are "The End of the Terrace, Abbey-Leix" (8), "Amorini, Melbourne" (19); "The Terrace, Bulwick" (39), a broad green walk between a splendour of flowers; "The Gardens of the Alcazar" (57), with their curious-coloured tile panels in front of the seats; and "Rockingham Castle" (67), a delightful old rambling Late Gothic house flanking a garden fenced in by masses of clipped hedge as big as haystacks.

WE are glad (in a sense) to have learned that we did an unintentional injustice to our contemporary, the *Architect*, in referring the other day to an apparently consensuous absence of reporters at a meeting of the Architectural Association, and that their representative was absent from unavoidable causes. Part of the paper read on the occasion, and published at first only in our own columns, was reprinted in the *Architect* last week with the author's concurrence.

THE ADVANCEMENT OF ARCHITECTURE.*

BY PROFESSOR AITCHISON, A.R.A.

WE see that all the tribes of the earth who have aggregated themselves into a nation, and have risen to a certain pitch of civilization, have at their most flourishing time had an architecture of their own. This architecture has at least embodied their wants when their buildings were houses; and when public buildings were required, they were built in a larger, grander, and more ornate form: while their temples, which were to honour the deities they worshipped, were not only larger in size and of the best workmanship, but adorned with the highest ornamentation that was able to be produced. Temples and public buildings show the knowledge of the art of building such nations possessed, the shapes they liked, having regard to the materials they had to build with; while the ornamentation of their temples show the forms in nature that they admired. Some savages have a taste for modelling the animals they see about them, the Kaffirs, for example, and probably they include man. Men and animals would, therefore, probably adorn their temples, if they had any. If the people were imaginative they would probably endow the forces of nature with human or mythical forms; the sun would be their first and most benign deity, for from him they got light and warmth; the moon would be an inferior deity, who gave them light when the sun had sunk. Lightning, tempest, cold, hunger, disease and death would be evil deities, and other deities, both good and evil, would be created in accordance with the climate and the position of the country. The people who live on plains or table lands would know nothing of the sea, while the dwellers on the coast or small islands would worship and propitiate the sea; and the beasts, birds, fishes, and reptiles of prey would be different in shape and habits.

* Being the sixth Royal Academy Lecture on Architecture this Session. Delivered on Thursday evening, February 24, 1895.

The beneficent forces might be shown in human form, or be compounded of the best man with the most useful animal, while the hurtful and destructive forces of nature might take wholly bestial forms, or be compounded of the mental picture of enemies and of predatory animals. The Greeks, who had brought the human body to its greatest perfection, by training, mostly invested the forces of nature with human form; in the jargon of the day, they are said to have had anthropomorphic tendencies. But even the Greeks made mythical figures as well, mostly compounded of men and animals, but sometimes of mixed animal forms alone; the first sort were winged human beings—centaurs, satyrs, sirens, gorgons, harpies, and men-dolphins; the second were winged horses, chimæras, and griffins, and some of these figured on their temples. Pictures are the first efforts of advanced savages to portray current or historical events; this portrayal rose into hieroglyphics and eventually into alphabetic or into sign writing. Even when alphabetic writing was known, the use of it was confined to a small and select class; and for the bulk of every nation it was by buildings, by pictures, and by sculpture that impressions had to be conveyed. Even to this day in England, where it may be said that everyone can read and write, certain events, and certain emotions are much more vividly conveyed by buildings, pictures, and sculpture, than by written or printed letters. You cannot convey form, colour, or bodily expression by words; still, there is all the vast realm of speech, of thought, and certain phases of mental emotion, that can only be expressed by words, and it is in the world of words that most people now live.

Not to speak of the architecture of the remote East, the Assyrians, the Egyptians, the Persians, the Indians, the Greeks, the Romans, the Saracens and the Mediaevals, had each a distinct style of their own. Each of these separate styles is strongly marked, and could not readily be confounded with another style, until the art of forgery became popular. This cannot be said of Christendom now, for so small are the inventive powers of the moderns, and so humble are their desires, and so skilful are they in imitation, that they would rather adopt the style of a people scarcely emerged from barbarism, than endeavour to do anything of their own. In early times people could not copy even if they would; they could only gain a general impression of what they saw, and reproduce that impression. Even in Christendom young children cannot copy, though as they grow older their native powers are spoiled by being taught to copy. It is not to be supposed that men who could measure, draw, and model could not have copied, but they probably did not desire; they tried to seize the idea of anything that was useful or beautiful and to alter it to meet their own views and to make it their own. Plenty of cultivated Romans had seen Athens, and some confessed that they could not equal the Athenians in the arts and sciences. Virgil, for instance, says:—

"Let others better mould the running mass
Of metals, and inform the breathing brass,
And soften into flesh a marble face;
Plead better at the bar; describe the skies,
And when the stars descend, and when they rise."
(Dryden's "Virgil," E. 6, line 1, 168-72.)

But they did not copy the buildings on the Acropolis; they despised the people they had conquered, and would not copy their works if they could; they wanted Roman architecture to be Roman; and in construction the Greeks were children to them. The Romans were absolutely destitute of original artistic invention in such a supreme fine art as architecture. Until the days of the Italian Renaissance no highly civilised people, to my knowledge, had such profound humility as to desire to literally copy any other people's work, even though it was better than anything they could do. As far as sculpture was concerned the Italian task was to try and rival or surpass the antique sculpture they found, whether that sculpture was Greek or Roman. Sculptors must determine whether the Italians did surpass it, but everyone must see that a new spirit animated it. I will only point to the helmeted figure seated in the Medici Chapel, whether that figure was intended for Giuliano de Medici, *il gran diavolo*, or for an embodiment of thought.

In architecture the aim was to reproduce the antique and to strictly adhere to the old Roman forms and proportions.

It has been stated that the Italian architects of the Renaissance intended to make architecture progressive when they had equalled the Romans, but found they could not. This is curious and well worthy of study, and, if possible, of elucidation.

* "Antiquities of the Inns of Court and Chancery," by W. Herbert. 1804. 4to.

tion. Renaissance architecture had begun in Italy while Gothic was in full force in the West, and the increasing taste for the new Italian architecture forced the Western architects to effect a compromise between Roman and Gothic. The style thus produced was very charming, but was not destined to be progressive. The historic castles of France are the main examples. It was long believed that the Gothic architects of France handed over their constructions to Italian architects to be Romanised; but the late lamented Léon Palustre conclusively showed that this hybrid style was purely due to French architects. He has furnished us with the names of hundreds of French architects most of whom were before unknown. We should like to know the course of study they pursued, but probably our desires are doomed to disappointment.

The admirers and imitators of Gothic have often proposed that the profession should master this style, and start a new one on its basis, the only question being whether the starting-point should be the last period of Gothic, or the period when it had reached its greatest vitality and vigour. Hitherto the scheme has produced as little effect as the Renaissance one. I think this is not to be wondered at, for if the Gothic architects of the West could not succeed, how can we hope to? These artists had the current Gothic construction at their fingers' ends, and their construction in stone was the best then to be had in Europe, while society then wanted its aspirations embodied in buildings, and had a passion for gorgeousness and magnificence. Let us contrast the attainments and desires of the middle of the fifteenth century with those of the end of the nineteenth, and take them in the same order. Assuming that the present architects have the same skill in construction as the Gothic ones, is stone the best material that can be used for an advance in construction? No, iron is. Is the skill of the architects in construction the greatest that can be found? No, it is like comparing an ordinary walker with him who had on the seven-league boots.

Sixty-five ft. was about the span of the greatest Gothic vault. Sir B. Baker's Forth Bridge has a span of 1,700 ft. Does society desire to have its aspirations embodied in buildings? No, it wants its highest aspirations embodied in an Act of Parliament. Has society a passion for gorgeousness and magnificence? No, it is quite content with ugliness and meanness, if consistent with luxurious comfort. And these are by no means the only causes; how could the Renaissance architects advance while they were dealing with the expression of the skill, knowledge, and taste of a people different from themselves, and were bound to adopt the recipes left by the Romans? It is not strange that the hybrid produced from Gothic and Roman was sterile, when the Gothic architects were trying to graft on to their own native expression that of another people with the whole order of whose thoughts they were not familiar. No one can wholly remove himself from the influences of his surroundings, so we may look on any attempt to make Gothic progress as inevitably hopeless. The stealing of birch-brooms ready made is not the training wanted to get skillful broom-makers.

I said that I believed that no highly cultivated people before the Renaissance literally copied, but I believe Egyptian architecture was copied or paraphrased in Egypt during the sway of the Greeks and Romans. Archaeologists alone can tell whether the temples then built were executed by Greek or Roman architects. It looks to me as if the rulers, who naturally wanted to be popular, were aware of the intense conservatism of the Egyptians, especially in religious matters, and for this reason gave the temples to be designed by native architects in the native style. Supposing the Temple of Isis in the grounds of Hadrian's Villa was a copy of an Egyptian temple, it was only for a sort of masquerading business to amuse him and his visitors in their idle hours, just as some great man over here might have an American Indian wigwam or a Gothic summer-house in his garden, to amuse the ladies.

The desire to imitate Roman buildings rapidly spread from Italy to the farthest limit of Christendom, but out of Italy the desire was rather to Romanise every building than to copy Roman monuments; but it eventually led to the introduction of nearly pure copies of Roman work, and at last it became disgraceful not to copy.

You may see this view taken so late as the latter half of the last century, by Milizia, who wrote the lives of celebrated architects, and who only died in 1798, long after the imitation of

Greek and Gothic had sprung up; Horace Walpole died only a year before him.

Though the imitation of Roman and Renaissance architecture is going out of fashion, imitation is still looked upon with the greatest admiration and respect. Gothic, except for its construction, which is far behind our own in iron, is inferior in grace and proportion to what can be now done, and the same may be said with still greater emphasis about Gothic sculpture and painting.

It is no use using hard words about imitation, if there be nothing of our own to take its place. To say, do not imitate Roman, only lays us open to Tom Sheridan's retort to his father, when he advised him to take a wife:—"Yes, sir, whose wife shall I take?" If we could be sure that there would never be any high aspirations again, or that their embodiment was to be in an Act of Parliament, or if the reason of architecture not progressing was not from a wrong method being adopted, but from a natural imbecility of mind, I should say to the architectural students, turn engineers, or devote yourselves to drains, warming, ventilation, and the price of bricks, as there can be no doubt that all people are deeply interested in these subjects; but to ask you to relinquish your aspirations for expressing the thoughts, culture, impulses, and ideas of the day for pelf, would be like asking the great poet of the day to avoid high subjects, and to try his hand at a new rhyming penny table.

When imitation Gothic was rampant, architects, image makers, ornamentalists, and painters, started schools to teach mechanics how to imitate Gothic carving and painting. The real Gothic image makers and painters did their work as well as they knew how; they went so far as to draw from the nude. M. Jusserand in his "Literary Life of the English People," gives an extract from the Chronicles of the Abbey at Meaux, near Beverley, in which it is stated that the Abbot, Hugh of Leven (1339-1349), having ordered a new crucifix for the chapel of the convent, the artist "had constantly before his eyes a nude man, and he tried to give to the crucifix the beauty of form of the model." Here in the fourteenth century, we see the artist trying to do his best, and going the right way to work; in the nineteenth century we see him purposely trying to do his worst; there is no hope for him, nor for those who encourage him in learning to forge. If there is to be progress we must avoid conscious follies, and not only do our best, but encourage others to do it.

Looking at the achievements of Christendom during the last century and a half, in other directions, it would seem incredible that the Christian world was struck with imbecility in this, and could not proceed a single step towards the improvement of a progressive art like architecture. We live, it is true, in a world of words; the foremost men are engaged in unravelling the secrets of nature or the past, or in making machines to apply the forces of nature for common use. The things wanting are a comprehension of the supreme importance of the visual fine arts and a sense of the beauty of form; this last is one of nature's gifts to man, for his solace, his purification and delight, but it is withering away, if not withered, from want of use; and if we do not mind, the asking for beauty of form in buildings will be shortly like expecting the apterix to fly. The art of sculpture would be extinct if it were not for a demand for the effigies of deceased persons and municipal busts. There is a considerable taste for colour, for people buy pictures for large prices. Some people say pictures are only bought because they are a better investment than a lead mine; but, if the taste were decreasing instead of increasing pictures would not sell for double, but for half their original cost. Never perhaps before was the word "Art" in so many people's mouths, and so often in print, but if distinction in form be a part of it, then I think that if those who pretend to love art were to speak what they feel they would ask what it meant, just as Napoleon's Staff in Palestine asked why it was called the Holy Land.

I am not one of those who deplore the use of machinery; it has made the necessities of life much cheaper, as well as those things that have almost become necessities to us; but, as a French wit said, the invention of the *lift* is useful and shows great ingenuity, but supposing a man spent his whole life among *lifts*, would he be wiser, better or happier? Some very clever architects have said, if there is to be a new style, you must wait for another irruption of barbarians, but Byzantine did not owe its development to such a cause, nor did Gothic, but before there is a chance of a new style there must be a long period of systematic

teaching, and a long series of buildings with a structural or an æsthetic want to be satisfied. It was two hundred years at least between the foundation of architectural schools by Constantine to the building of St. Sophia; doubtless there was some sort of architectural instruction in the English Abbeys from an early date, but the abbeys were liable to all the incidents of war until the barbarians had settled down. The Norman Conquest was in 1066, and it was not till near 1200 that Gothic emerged. I should be a prophet if I could tell you whether a development would take place, and in what direction, and could give you a recipe for hastening its advent. I only think there may be, because of the advance in knowledge, skill, and enthusiasm of the architectural students, and an undoubted desire to see something characteristic of our age, instead of a chaos of paraphrases. We can see all the phases of each particular style of the past with no more trouble than turning over the illustrations of a book, but it must have taken a long time between the first and last step of each epoch. For example, from the time when the first Greek carpenter rounded the head-piece on a tree trunk supporting a bressumer, and gave a nick with his axe at the bottom to make it effective, until the Ionic capital came to perfection as a shell spiral at the Erechtheum; and that carpenter certainly never dreamed of what his invention would lead to. So it was with Gothic. The first architects who used the light pointed arches, vaults, and lancet windows, did not see it ending in Rheims, Beauvais, St. Urban, or St. Wulfran; neither the moslem architect who designed the cusps for the Mosque at Cordova, nor he who put the stalactites to the well-house at the Mosque of Ahmed-Ibn-Tulan, foresaw the Mosque of Sultan Ilassan, nor the Alhambra. In the cases I have mentioned, the architects must have been ready to seize an idea and improve on it, and those for whom the work was done must have admired it; for it is clear that if it was not liked, people would not have had it done twice. To solve the problem of how to make people care for architecture one must know the cure for the deaf adder, and that cure seems rather to point to the will of the reptile than to a physical infirmity. It has occurred to me that something might possibly be done in this way; if a promising younger son of one of the nobility or gentry showed any admiration for the works of the visual fine arts, he might, after he had taken his degree, spend five years in an architect's office, three years in a sculptor's, and three years in a painter's studio. He probably would not become an architect, a sculptor, nor a painter, but he would learn what these arts meant, and would probably hear from his fellow students their aims and aspirations. Government have the ordering of a good many important buildings, and some statues, and it could have striking historical events painted. If this young nobleman or gentleman were made a Fine Art Minister, he would probably try and get such works done, and done well, and would explain to the House and to the people their importance.

I do not grudge the 75,000*l.* paid for the Amedei Raphael; it brings us credit, and helps to bring us visitors; but that sum would have gone a long way towards completing the historic pictures in the Houses of Parliament, or of decorating with pictures any of our public buildings. A grant was asked for in the House for completing the mosaic pictures in the octagon, and would have been carried, had not someone suggested that we should wait for an English Titian. When I was a schoolboy, there was a sort of Greek Joe Miller, called Scholastikos; he was nearly drowned, and vowed he would never go into the water until he could swim. He was as likely to become a fine swimmer as we are to get a Titian, if no public painting is done. Greece and Rome were once teeming with wealth and population, and were the centres of attraction in the world, but you might as well ask, Where are last year's snows? as, What has become of all their population, industry, wealth, honour, and glory? What is the residuum of it all? A few poems, a few pieces of oratory, a little moral philosophy, a few statues and bas-reliefs, a few lovely engraved gems and a few coins, a few sublime buildings, and many ruins. The essence that is extracted from the toil, the striving, the happiness, and the misery of the millions of our countrymen, can only be the possession of remote posterity, if this essence be enshrined in sublime works of art; and it is for the architects to strive to endow their buildings with that sublimity that ever keeps young.

Beyond the fine arts, we may say that the names of some lawgivers, some great discoverers of the laws of nature, and some conquerors may

survive, but we must not forget that verse of Horace's song to Lollius:—

"Many, many have lived, who were valiant in fight,
Before Agamemnon; but all have gone down,
Unwept and unknown, in the darkness of night,
For lack of a poet to hymn their renown."

(Book 4, Ode 9, l. 25.)

Sir Theodore Martin's translation.)

The late John Addington Symonds put the conditions of immortality into a maxim. "Nothing is imperishable but high thought, to which art has communicated the indestructible form of beauty." What sums up Ancient Egypt? the Pyramids, the Sphinx, and its buildings. What sums up the Middle Ages? Dante's Divine Comedy, Boccaccio's Stories, and its cathedrals, its abbey churches, and its fortifications.

Let us now look at the conditions and circumstances immediately preceding the development of Byzantine architecture. It arose after there had been a great constructional advance in Diocletian's reign, who died in 313 A.D.; there was a perfect fervour in building when Constantine transferred the capital to Byzantium in 330, and he had greatly stirred both his Pagan and Christian subjects by granting the right of public worship to the Christians. He started schools of architecture in Italy and north-west Africa, and had not only offered free youths of liberal education a premium for studying architecture, but had offered inducements to skilled artificers to settle at the new capital, and to bring up their sons to their own trades. Some 200 years after Constantine's death, St. Sophia was begun, which was marked, not only by constructive daring, but by novelty in its floral ornament. To turn to Saracenic, the Hegira was in 622; towards the end of the eighth century, Abd-el-Rahman built the mosque at Cordova, and it is believed that the falling of arches there was taken from North India. We are, however, in perfect darkness about Moslem dates. Ahmed Ibn-Tulun, died about 868 A.D., and his mosque was built by a Copt, or Egyptian Christian, and has nothing Saracenic about it but the plan; but the well-house in its court has stalactites. Some think this was built shortly after Tulun's death. These stalactites, we presume, took the people, for they flourished, and soon became one of the characteristic features of Moslem architecture. The treatment of them varied, but towards refinement and complexity, until they culminated at the Alhambra, and were not only used as cornices, but for the capitals of columns and for corbels, and eventually were used to fill the interiors of cupolas. The geometric surface patterns or mazes were sometimes left plain, and sometimes filled in with floral forms, and texts from the Koran were also used as ornament. It is curious that these Saracenic patterns were used for all the ceilings of the late Gothic churches in Madeira and the Canary Islands.

In Richard Cœur de Lion's reign, who was crowned in 1189 and died in 1199, Gothic is supposed to have begun, Romanesque had arrived at considerable excellence both here and in other parts of Europe, in fact, grander internal effects were produced by it than were ever attained by Gothic, but it was rudimentary, less scientific in construction, and infinitely less skillful in its mouldings. The victories over the Saracens and the triumphs of the Cross no doubt, stimulated the minds of the people at home, while vast multitudes had travelled through Europe, Asia Minor, and Syria, and intercourse with the East had become much greater after Jerusalem was in the hands of the Christians. It is most probable that architects, as military engineers, had seen most of the architectural masterpieces of Europe and Asia; for we must remember that Vitruvius was an inspector of artillery, and Anthemius of Tralles a military engineer. I suppose, too, that the Saracens were then the most advanced people in the world—at any rate, if in some respects they were less advanced than the Romans of Byzantium, they were a more courageous and energetic race. The study of philosophy, geometry, and mathematics had been pursued by the Saracens with great devotion. Averroes, who commented on Aristotle, died only a year before Richard I., and we must recollect that David Hume said where there are no philosophers and metaphysicians we cannot expect to see good weavers, carpenters, and shipwrights.

As I have said before, Europe during the Middle Ages was saturated with Saracenic lore. One of the intellectual passions of the Saracens was the study of geometry. The Saracens not only loved geometry, but found out that patterns made from polygons had a certain beauty and mystery about them, their greatest faith in our eyes is that they seem to wink, and they covered

everything with these geometrical patterns—panels, flat and curved surfaces of buildings, their furniture, arms, and utensils—frequently interspersing bands of texts in ornamental writing with the patterns. Only heretical shahs would draw man or animals, so that the active minds of the orthodox were driven to these geometric puzzles, the solution of which have only been found out within this century. The Gothic architects and workmen got bitten with this geometrical passion. What influence the Saracen servants in England and our Saracen colony had in fostering this geometric study we know not.

In the present day, if a joiner or cabinetmaker has to mitre elaborate mouldings, he works them on the straight, and cuts them by a mitre-box; but this could not be readily done in the case of a stone skewback, or at least was not done; the complicated Gothic mouldings were projected on to the play of the skewback and worked by the chisel. This shows great accuracy in projecting and in working; for you must remember that all Gothic stonework was worked before it was set. So proud of this skill were architects and workmen, that interpenetrating mouldings became the fashion.

There are two points to be observed in this peculiar state of things; one is the rapid progress made in the elaboration of each idea, and the other is the hold every new turn took on the public mind. I hope you will excuse me if I am a little long, but I have not had that affluence of time to arrive at conciseness.

The Romanesque aimed at impressiveness by size, and by striking forms—see the pillars of Durham and elsewhere, with their chevronned or spirally ornamented shafts, the great round arches, the big mouldings, and zig-zag ornament. When Gothic came in, though the arches were pointed, all parts were quite as simple, perhaps even simpler, than in the Norman; the windows were lancets, and subsequently in doublets, with a column between and a hole in the spandrels; then came the suppression of the column between the doublets, and the turning of the whole head into cusped tracery, and gradually everything simple, and everything solid seemed to melt away, and there was nothing left but pierced work, be-cusped and be-crocketed, and eventually ceilings and archways ran into pendants, and mouldings interpenetrated. We may be sure that these pendants and this fretted work took the fancy of the people, from their continuance in the work of Elizabeth's and James I's time, when they were no longer constructional but purely ornamental additions. The elder Teulon built a church at North Woolwich, and substituted pierced work of floral forms, as a heaven-sent relief from the ubiquitous cusp, but it seems to have taken no one's fancy, and there remains, an almost isolated example. It was original and pretty, and if it had been greatly admired, it would have been a new motive to be gradually brought to perfection. So I think we may safely say, that the want of progress is due rather to the apathy of the public than to the want of invention.

I think it will be generally admitted that at the present time there is no traditional style of architecture in England; the imitation Roman of the Renaissance began to die out in the time of Wren's successors, and died about the time Marylebone Church was built, for then almost all buildings of importance began to be paraphrases of Greek architecture. There was, too, a revival of Gothic, and the revivalists certainly wrested all the church building from the Renaissance and Anglo-Grecian architects; it is not quite exact to say *all* the churches, but the exceptions were trivial; and owing to the passionate literary advocacy Gothic received, it secured for itself such important public buildings in London as the Houses of Parliament, the Albert Memorial, and the Law Courts. Subsequently all the hybrids begotten of Classic and Gothic from every country in Europe have been and are still being tried.

Travelling has enormously increased, and most of the architectural students and young architects have seen at least half Europe, and photographs of most of the architecture of the world are common. It is difficult to say whether the emulation stirred by seeing the masterpieces of other nations and other times has been the motive for the advance of architecture, or whether it has been from the activity of mind created by travel; but the two great modern styles, Saracenic and Gothic, sprang into existence after the Moslems and Christians had seen the greater part of the architecture of the world. Shortly before the Saracen invasion, in the seventh century, the Saracens did not appear to be able to build at all, and it seems not to have been till the tenth

century that those features that particularly mark the style appeared, took root, and began to flourish; and not only were these peculiarities, the stalactites, the geometrical patterns, and the ornamental writing, pushed to the greatest extent, but a mastery of form and composition was gained by the architects; for the later work points to a highly cultivated taste.

It was not till the Third Crusade, in the days of Richard I. and Philip Augustus, that Gothic emerged. The extraordinary rapidity with which the improvements in construction and in aesthetics proceeded is amazing, so that St. Urban at Troyes might be taken for a work of the latter part of the fourteenth century instead of being completed in the thirteenth; this shows that the architects had a firm grip of the requisite skill and knowledge to carry out the vast and wondrous buildings called for, and to improve as they went on. When R. Stephenson thought a large, tallboy might be used for the Britannia tube, very little was known about wrought-iron; experiments were made at the expense of the Chester and Holyhead Railway Company; and the mathematical attainments of Hodgkinson, the practical knowledge of Fairbairn, and the attainments and inventiveness of all the engineers of the railway, of Ross, Forster, Edwin Clarke, Campbell, J. Wyld, and others, were put into requisition and were directed to these experiments. Eventually a width of nearly 500 ft. was spanned successfully by a wrought-iron box; this was then a marvellous feat. Some forty years after its completion the Forth Bridge of 1,700-ft. span was successfully made without causing any particular astonishment in the public, or its great engineer being looked on as one of the wonderful men of the world.

The architects are, or ought to be, the poets who proclaim the greatness of the achievements and the discovered wonders of this age, only their language is expressed in brick, in stone, in marble, or in metal.

The capturing of some of the forces of Nature has given us swiftness and light, power and wealth, so that the whole of mankind are not only more numerous, but better fed, better clothed, better lighted, better taught, better physicked, and better healed, than it ever was before.

It is thought a highly imaginative episode in "The Arabian Nights" when we are told that Solomon put the rebellious spirits of the air into bottles of brass and sealed them with his seal, but the spirits of steam and electricity were rebellious to men, and we have now confined them in vessels of iron, and, more wisely than Solomon who threw them into the sea, have made them work for us. Some day mankind will want to celebrate all these achievements over the forces of Nature, and will ask the architects to embody them in buildings. What I have striven to do is to stimulate you to get as firm a grip of the means of emotional building as the engineers have of the practical in iron; so that when mankind again turn their attention to architecture, those happy accidents that gave the flavour to Saracenic and Gothic may be seized on by the architects and brought to perfection. I have often pointed out the studies of the poets to perfect their language, and to learn the methods of producing emotions; these studies are the reading, the paraphrasing, and the analysing, of all the poetry that existed up to their time, with the efforts they make to express their own emotions equally well. As far as I can see, when you have mastered construction, there are no other means but these to learn the emotional possibilities of building. Speaking roughly, the students are too often woefully deficient in a knowledge of plain and solid geometry and of statics; they pay but small attention to lighting, even of the practical sort, and scarcely ever attempt the emotional. I once saw a new church, the nave of which was roofed, but the aisles had only the rafters on, so the nave was dark and the aisles were brilliantly lit; the effect was both excellent and striking, but the architect laughed at me when I advised him to keep to this effect. Viollet-le-Duc said, if we might make a concentrated definition like Buffon's "the style is the man," we might say that "moulding is architecture"; if so, we have none, for mouldings are in the antiquarian chrysalid state. An architect's mouldings are approved if they belong to the architectural epoch he imitates, so that in spite of differences in taste and in climate, Greek, Roman, Saracenic, or Gothic mouldings are looked on as equally good and appropriate for us and for our climate. Mouldings should, of course, be made logical as to sequence of forms, graceful in section in accordance with the highest taste of the day, and effective for their end, by being made suitable to the

climate. The proportions of buildings and the shape of their parts are fairly good from an antiquarian's point of view, though in the bulk of modern architecture not so good as they should be; but to progress we must vary both, so as to convey the character and emotion we want conveyed. There is now an attempt amongst a few to do this. We cannot reasonably expect that new proportions and new shapes will at first rival in excellence the forms and proportions that have been perfected by centuries of trial; all we can expect is the absence of contortion and vulgarity, if the emotions wanted are produced. We want also to enlist the efforts of the ornamentalist, the sculptor, and the painter in the same direction; at least if we are ever to have a completed architecture that will rival, must less distance, the past. All the vegetable and floral forms of nature are not comprised in the lotus, the honeysuckle, the waterleaf, and the acanthus, though it probably took several hundred years to perfect these native forms, and make them harmonise with fine architecture and adorn it. Natural leaves and flowers roughly copied and applied are poor in the extreme as compared with fine architecture; for leaves and flowers have a very different object than that of adorning architecture. We can hardly hope to equal the egg and tongue, or the waterleaf of the Greeks, but we can and do hope that people may one day begin to love some flower; a dog-rose, a daisy, a buttercup, a violet, a fritillary, or a dandelion. If we could find people loving these things, that they can neither eat nor make money of, and desiring to have them on their buildings on account of their beauty, our ornamentals, who are fairly skilful, would be able to adapt them for architectural ornaments.

Architecture is essentially of the time in which it is built, for it is wanted at that time for some material or emotional need; the arts that help to adorn it would have a more powerful effect if they could represent the present too, but in the case of sculpture or painting that is impossible, because it restricts the artists to animals and the Sandwich Islanders. They have to go back to Greek times to show the beauty of mankind; for hat-makers' blocks, tailors' dummies, and shoemakers' lasts, even with a man's face thrown in, are either contemptible or ludicrous.

There is not much time left to endow the nineteenth century with any architecture characteristic of it, but that is a more cogent reason for devotion and effort. Architecture never dies, except when man relapses into savagery, and if we cannot perfect our architecture in this century, I do not know a nobler aspiration than helping the twentieth century to have an architecture of its own. Thought and science have had their martyrs, and, partly through those martyrs, thought and science now flourish beyond any other high efforts of man. The martyrdom of the best or the worst architect is hardly likely to extend to the rack, the cross, the stake, or the gallows. The utmost that is likely to happen to the best or worst of us is starvation or oblivion; but I feel sure that you who have declared your allegiance to this sublime master art, will refuse to be deterred by these grisly spectres from doing your best to help it to rise to a height that the world has not yet seen.

THE ARCHITECTURAL ASSOCIATION.

The ordinary fortnightly meeting of the Architectural Association took place on the 1st inst., in the meeting-room of the Royal Institute of British Architects, 9, Conduit-street, Mr. A. Beresford Pite, Vice-President, in the chair.

A vote of thanks was accorded to Mr. E. A. Runtz for allowing the members to inspect the new Pavilion Theatre, Whitechapel-road, and for entertaining them afterwards.

Messrs. P. W. Meredith and J. W. Abraham were elected Members of the Association.

Mr. T. Stirling Lee then gave an address on "The Use of Sculptural Decoration at the Present Time." Mr. Lee said that when they looked at a great deal of the carving on buildings, they saw that it was the very worst part of the work, and if such fearful execution was put into the joinery or any other part of the building, it would be condemned at once. The mouldings would often be found to be good, but when they came to the capitals the whole thing went "right into a hole," or as Mr. Pomeroy would put it, "it was beautifully carved, just like iron, the caps being out of key, and the whole thing cut up. He, therefore, desired, first, to speak about the use of sculpture. A visit to the British Museum would show that it had a use. The ancients had something to express, and they, so to speak, put the reason of

their buildings into figurative and symbolical language. In the remote ages, and even before they had tools, people took a flint and a bone and drew forms. Why, then, did these people actually draw animals and other objects, and why did boys at the present time naturally take to carving? It was because they had in their brains the faculty of form, and that they would use it. The question then was how they should use that faculty which they possessed? He would like to consider such a building as St. George's Hall, Liverpool. Some forty years after that building was erected, the authorities advertised for sculpture to complete the work, and a plan was sent round to all the sculptors. It struck him as being a magnificent opportunity, and he set to work quite as enthusiastically as Elmes did in the first instance. The building was principally an Assize Court, and Justice was the thing which should be written on its walls. Three sketches were sent, and four smaller ones; and afterwards, when they came to look at the thing carefully, they found that the whole should as far as possible be a frieze. Having decided that, they had to alter the subject, and it was found that the figures would have to be erect, and that on the pedestals above suitable statues should be placed.

The question then was as to the necessary relief that would be required, and that was a matter entirely guided by the surrounding members and mouldings. The actual light and shade of the mouldings had to be carried through on the keynote of the light and shade and depth and relief of each panel, and these lines had to be joined and tied in every one of them. He first worked in clay, and to get the clay treatment he had to make the lines perpendicular, stiff and straight. In England one had to consider the soot shades, which exaggerated the treatment. The first thing to do was to put the thing further back, so that the mouldings acted as shelters. In working clay it should be remembered that they were building up the whole of the time, while it was just the opposite with stone, in which case they had to work down. He therefore had a mass of plaster made just the necessary height, and drew his work upon it, as he would on stone, carving the lines direct. (Two panels were shown, exhibiting the difference in the result, between building up plaster from the ground, and working down into it from the surface.) In reference to this point he would remark that the Greeks had a wonderful knowledge of the effects of light and shade, as could be seen in the case of the Parthenon frieze. (As an instance of this Mr. Lee drew attention to the incident of the slightly higher relief given, in the Parthenon frieze, to a figure near the angle, so as to strengthen and accentuate the effect at the angle.) People were now beginning to recognise that they could decorate their houses without pictures, and many sculptors were entrusted with that most charming opportunity, a chimney-piece. Architects who were designing a house which would contain such a feature as a chimney-piece, should consider if it would look well. Such a feature might be a piece of beautiful sculpture, but the effect would be poor if it was not well lit. In fact, it was a complete waste of money to put good work where there was bad light. Where there was a fine chimney-piece, no other sculpture was required, and in placing decorative work of that description in a house, they should carefully consider how it was to be seen.

Mr. F. T. W. Goldsmith, Senior Hon. Sec., then read a communication from Mr. W. Young on the subject, in the course of which the writer said: The subject of the use of sculpture in architecture is a most interesting one, and one which I have done my best to promote, not only in talking and writing, but in actual work—because I believe in it. Sculpture in building, has, in my opinion, been too much neglected, and ornament has been overdone. One would rather see in a building a small amount of really good sculpture, than a large amount of ornamental work. At the same time, one must not forget that sculpture on any great scale can only be done on public or monumental buildings; in domestic work, it is not likely to hold a large place. I think it is the place of the architect to produce sculpture in place of ornament whenever he has the opportunity, or rather he should try and make the opportunity. The question of cost is undoubtedly a difficult one to overcome, but I think if we, when the opportunity of using sculpture occurs, put clearly and forcibly before our clients the difference in result and value between sculpture and ornament, this difficulty may be overcome; at least, such has been my experience. But, granted the opportunity to employ sculpture, which is the grandest

decorative aid to architectural design, we must take care that it is not merely figure-carving in stone, but sculpture of the highest class, which we must aim at. In my opinion, sculpture in architectural work brings out the highest qualities of the artist. There he deals with its conception, with its composition, with its proportions, without going into the elaboration of too much detail. For sculpture in architecture should, first of all, be broad and very simple. It is also necessary that it should be to a scale, both in size and relief, proportionate to the place in the building which it occupies. One has seen in many of the recent efforts to adopt sculpture in buildings figures of such a small size, and so out of proportion to surrounding work, that they look like toy figures, only fit for the Lowther Arcade, and forming no part of the architectural scheme. Not only should the scale be proportionate to the building, but it should not be any random figure, stuck in in any place, but the whole should be part of a scheme both in subject, in size, in treatment, and in relief, so as to form a harmonious part of the building which the sculpture decorates. I am afraid that in the present day, with a growing tendency to produce sculpture in buildings, we shall get, as we have in other things, a cheap and shoddy sculpture. If we employ sculpture at all, we should take care that it is of the very best. It should be sculptor's sculpture, and not stonemason's sculpture. I had an example of this a little time ago, when a man was introduced to me who offered to execute a 7-ft. statue in stone for one of my buildings for something like 30*l*. I happened to have seen some of the man's work, and in reply, while thanking him for his kind offer, I remarked to my friend, standing beside me—who said, "Very reasonable price?"—"Yes, but I would rather pay 50*l*. not to have his sculpture in your building, than pay 30*l*. and have it." My advice to you is: Avoid this kind of sculpture, as well as all pretence at sham art. If you cannot get the real article, do without it.

Mr. F. W. Pomeroy next read a paper on "Plaster Work." After a few preliminary remarks, he said: The material known as plaster of Paris is the basis of nearly all work I shall consider this evening, and is used by sculptors and others for taking casts, &c. It was well known to the ancients, who obtained from Syria, and probably other countries, a stone called by Theophrastus "gypsos," which resembled alabaster, and was converted into plaster by burning in a suitable furnace, grinding and sifting. If one part of plaster is mixed with about 2½ parts water, after a time it sets into a hard and enduring mass. It was employed in the same way and for similar purposes as at the present day. One of the most important deposits is that of Montmartre, Paris, but it is also found abundantly in Derbyshire, in this country, and many other parts of Europe and America. The purer semi-transparent specimens of gypsum or alabaster is used for ornamental works, such as the masonry and statuary of a very durable and beautiful material for interior work. By adding a little lime to plaster-of-Paris, it causes it to set slower, but increases its hardness. Substances other than lime are also employed for the purpose of rendering the mass hard, thus Parian cement consists of fine plaster mixed with alum and borax and reburning.

A cement used by marble-masons is made of the same plaster mixed with a small quantity of alum and soda. For building work, a first coat is generally laid on of lime thoroughly slacked (so as to be free from all tendency to contract moisture) and mixed with sand and cow-hair.

The face of this coat (which should be of considerable thickness) is trowelled or indented with cross lines to form a key for the finished coverings. The second coat is applied when the first is thoroughly dry. (This is a necessary precaution, or the damp will work through and destroy or discolour any decoration that may be applied.) It is then rubbed with a flat board or float, so as to fill the indentations and cover the surface equally. The ornamental or finer plaster-of-Paris is then applied before the second coat is quite dry.

Many architects desire that their ornament should be modelled *in situ*, and I am fully aware of the importance of this, but have always found that it is quite impossible under the present conditions of building to carry out entirely a design of an elaborate nature, such as figure-work or intricate foliage; a simple design is possible only; and the plan generally adopted is to model in clay or wax a piece sufficiently large to form an idea of the scale and projection of the modelling, and offer it up in something like the position it will

eventually occupy. As a ceiling is generally lighted from windows that come underneath, a good way of testing the effect is to lay the model flat on the floor, and hold a good-sized looking-glass as high as necessary above it; by this means one can get a good general idea of the effect of the whole.

But reflected lights and other reasons demand that the work should always be considered in a liquid state—i.e., to be worked on and completed after it is fixed. This may be said to apply to all architectural decoration.

Where the windows run up close to the ceiling I have found flat or low relief most agreeable, and very high relief is never desirable; it harbours dirt and dust, and throws shadows which become very troublesome to the people who have to live in the rooms.

The charm of much of the old ceiling work, I venture to think, is enhanced by the many coats of paint or whitewash they have received, which has stopped up the small cracks in the work, and accidentally given breadth to the whole, and much modern work would be improved by the same treatment.

I have tried in ceiling work that I have been engaged on lately to avoid sharp undercutting, and, where undercutting is necessary, to give accent to the design, it should be done with a rounded instead of a sharp edge, and a much softer shadow is thus obtained. But as each fresh work is a new problem, so, the modeller, to have the true decorative spirit, must constantly bear in mind the general scheme of the mouldings that surround his work and govern the scale; and perhaps the most noticeable feature in modern surface decoration is overcrowding, and one of the greatest difficulties of the designer is to know how much to leave out rather than what to put in.

Indeed, the designer who understands this quality has got well through his troubles, and the value of an occasional plain space cannot be over-estimated.

Of course, the well-trained figure sculptor understands the value of tone, light and shade, and envelopment, but, unfortunately, the common or every-day carver has little or no time allowed to consider such abstruse problems; consequently his only idea is to make the particular piece of work that he is engaged on "sing out," without any regard to the ensemble.

For repeating ornamental plaster models, elastine, wax, and piece moulding in plaster are the methods usually employed. Elastine is the simplest and best when only a few casts are required, as it can be done without any complications in the case of undercutting. Wax moulds are generally used for the so-called fibrous or canvas casts of commerce, as the canvas in the plaster holds the moisture too long and destroys the face of the elastine.

Piece moulding is a more complicated way of obtaining reproductions, and is used by moulders who may desire to preserve their moulds for future occasion. The object to be cast is covered by a number of pieces of plaster, the edges of which are trimmed with a knife, and so arranged that they will each draw freely, then moistened with a little sweet oil and soap mixed, to prevent sticking together; when this process is complete it is necessary to hold them together by means of a case, also made of plaster. The liquid mass is then poured in slowly, and the mould turned, so that it may be covered equally.

When set, the outer case is removed, and then each piece carefully drawn away from the reproduction and replaced in the case. The thin seams which one sees on the plaster casts are caused by these joints in the piece mould. For work executed *in situ*, a mixture of Parian cement, well burnt slacked lime, putty and silver sand (the proportions varying for different kinds of work, but generally about two parts Parian cement to one of sand and one lime; but this is more properly stucco-duro), and a ground of Portland cement and common hair mortar is used, the Portland cement stopping the suction and allowing the applied stucco to set more slowly.

Stucco-duro, as practised by the Italians, is a very ancient method, mentioned by Vitruvius. It fell into disuse, but was revived in the sixteenth century.

Raphael and Giovanni da Undine were then so interested by the discoveries during the exhumation of the Baths of Titus, under Leo X., that they at once made experiments in this material, and the Loggia of the Vatican was one of the first results. It was composed of plaster-of-Paris, silver sand, and marble dust, and was capable of taking a high polish. In Kensington Museum there is a beautiful model of the central

hall of the Villa Madama in Rome, which was decorated by Giulio Romano and Giovanni da Undine. The model also exemplifies the possibilities of this composition, for its maker, Professor Mariani, of Perugia, has employed stucco-duro for the modelling of the ornament, which shows it can be used for the finest work; indeed, it is used by modellers for goldsmith's work as less liable to injury than wax. If used too quickly and heavily it will crack, but it must be modelled rapidly and surely, and only those of great dexterity need attempt it.

A stucco composed of plaster and glue-water is used by modern sculptors, and is preferred to clay for very large work. Mr. Watts modelled his great statue of Hugh Lupus, for Eaton Hall, in it; and the groups in front of the Trocadéro, in Paris, by Falguère; also the quadriga, temporarily placed on the Arc de Triomphe, were modelled in this material.

You first make a sketch model in clay or wax to scale, taking great care to have your proportions exact; then the large framework is made of iron supports and wood covering, and a rough coat is laid on; after this the work is modelled in the stucco. Finish can be obtained by using flat brushes; it has a very loose and pleasant surface if done properly.

Stucco work was much employed on the Palace of Nonsuch, built by Henry VIII. It was executed by artists brought from Italy, but every trace of this palace has disappeared; but the men left their influence, and stucco was employed to decorate houses until the end of the reign of Charles II., when it began to decline.

Grafitto, or sgraffito, is another way of decorating by means of prepared plaster grounds, cutting away or scratching through the upper surface, and revealing in parts a background of a different colour.

The first coat is made of sharp sand and Portland cement; the second coat is usually coloured with Indian red, yellow ochre, or manganese black. About one part of prepared distemper colour to one and a-half of Portland cement is the proportions for this. Then a final coating of selenetic cement and silver sand carefully mixed together is laid on very thinly, not thicker than one-sixteenth of an inch, before the second coat is quite dry. Then the cartoon, having been prepared, is placed on the surface, and the outline firmly pricked and pounced, the cartoon removed, and the design cut into the surface of the second coat, which is done with a steel scraper. Parian cement may be used instead of selenetic if the outer coating is desired white.

Care must be taken in cutting, which should be with slanting edges, which gives roundness and softness to the finished work. A good draughtsman will have little trouble in learning this kind of work, and it should commend itself to architects for its durability.

Gesso is yet another way of using plaster, but this more properly belongs to the painter's art, and is most successful when confined to very low relief work, as for the decoration of frames, caskets, panels of cabinets, &c. There are many kinds of gesso, and fine examples may be seen in Kensington Museum. For bold work plaster of Paris and thin glue or size water, a little tow pulled thin and steeped in the stuff, is used for building up your projections; a few flat-headed copper nails are useful if they can be driven into the background to prevent the work lifting. This should really be applied to a wood or fibrous plaster background, and it is always necessary to stop suction by painting the ground over with a coating of thin shellac.

For fine work, laid on with a brush, glass makes a good foundation; you can lay it over the design and copy through; the liquid gesso, which must be used hot, is composed of whiting previously soaked in water and mixed with linseed oil, and a little resin added. The proportions vary, but it can be made very easily, and a few experiments will ensure success. A pot of hot water should be kept handy to clean your brushes as the stuff cools. I have used, on the recommendation of Mr. Walter Crane, a very good stuff called "Denoline" sold by most colourmen. This is a fine powder done up in boxes, and is used by mixing with cold water only. You may make it stiff or liquid as you require it. It sets hard but slowly, and sticks fast—great virtues in gesso. Whiting and parchment size is the gesso used by frame makers; ordinary housepainter's putty worked up with whiting, oil and water, is also used for scrolls, &c. Carton piece is a material much used in France, but I have had no experience with it.

I was told of a method employed by an American artist, which struck me as being very ingeni-

ous. He had his gesso prepared and put up in leaden tubes similar to those used for oil colours. Then preparing his back-ground by tracing the design slightly on it he squeezes the gesso on, and flattens such parts as require it, with an ivory or steel tool. For mere line design this way is admirable, and one may work with great rapidity, much quicker than would be possible with a brush.

There are many processes for hardening plaster-of-Paris; one way is to dissolve a quarter of an ounce of soft soap in a pint of water, and an equal quantity of white wax is afterwards incorporated.

The cast is dipped in this liquid, or, if a surface of any dimensions, the mixture is laid on with a soft brush. After drying about a week, it may be polished with soft rag and French chalk.

Linseed-oil and wax is used by some, but this turns very dark in time, and in places where hidden from the light it will become almost black.

Another way is to give the plaster a thin coating of white shellac, then paint over this a good coating of boiled soft soap, and polishing when dry with a rag. This is useful for stopping the porous surface of the plaster, but it must be perfectly dry before the coating is applied. I am told a Mrs. Laxton Clark invented a means of hardening plaster, but I think all modellers would prefer putting their work in a more durable material.

The tools and materials required for gesso, stucco, and similar work can be easily obtained at various oil and colour warehouses in London. I have found that a child's rubber ball cut in half an excellent vessel for mixing small quantities in; it can be cleaned easily by merely turning inside out, and does not break; a few basins, a glue-pot, some iron plaster-spoons, and some small steel spatulas will also be required.

I have endeavoured in as brief a manner as possible to explain some of the most important uses of plaster for decorative purposes; but to become thoroughly acquainted with any particular work, the student should spend a short time in the workshops, for the secret lies not in the tools or materials, but in the hand and brain of the worker.

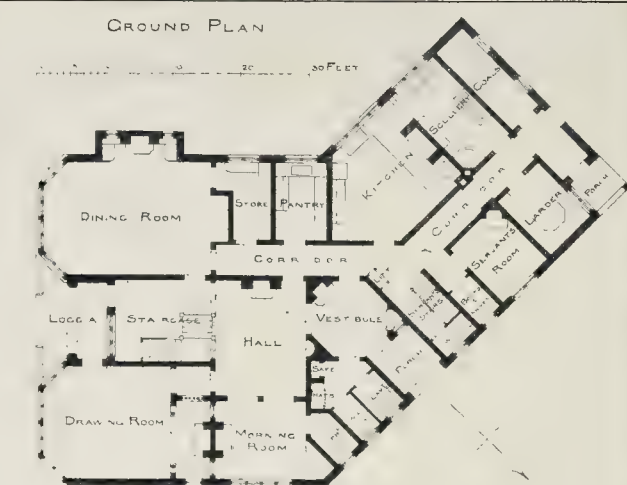
The Chairman, in inviting discussion, said that he saw amongst them Mr. Statham, who was a great and sincere friend of the Association. Though Mr. Statham had contributed a long and deeply interesting paper at the last meeting he hoped it would not prevent him taking part in the discussion that evening.

Mr. H. H. Statham said he could not but feel pleased at having the opportunity of proposing a vote of thanks for the two very interesting papers they had listened to, and also of expressing his sympathy with the general views contained in that of Mr. Lee. They must all feel that when sculpture had to be added to architecture, it must be sculpture with a meaning; it must have a reason for its place, and be as good as could be got. He would never forget the shock he received when he heard, a very eminent architect, now dead, in receiving a large number of architects on a great building, tell them, amongst other things, that, as the Government had accused them of being extravagant, he was happy to say that the sculpture on the building, which came to about £6,000, was about £53 less than the estimate. That was the only time he had ever heard an eminent architect congratulate himself on having got cheap sculpture, and he did not consider it very wise. They might depend upon it that if they had cheap sculpture, one or other was cheated, either the sculptor or the public. In regard to shop sculpture there was a good story, which he had told in print many years ago. The Dean of one of our cathedrals was going to restore the building, and looking at the new sculpture at another cathedral, he made inquiries as to the cost. Asking what a figure of David had cost, he was informed that the monarch's effigy was rather expensive, there were harps and other details. "Then," said he, "what about that angel?" "Oh," replied the man, "we think nothing of the angels; we turn them out by the dozen!" There was far too much sculpture on buildings at the present day which had the appearance of being "turned out by the dozen." What was wanted was that the sculpture should justify its position, by having some reference to the purposes of the building, and telling its story. As Mr. Lee had shown, the lines should harmonise with the lines and shadows of the projections of the building. He was particularly interested when he found that part of the theme of Mr. Lee's address was his dear old friend St. George's Hall. He had felt

the greatest vexation at seeing it left for many years entirely cold and unadorned, having been designed to be decorated with sculpture, upon which it really depended for half its effect. It was, therefore, with the greatest pleasure he heard a few years ago that Mr. Lee had, after much opposition, received a commission to carry out some part of the work, and he only hoped the whole of it would be carried out before long. He had also been very interested with Mr. Lee's demonstration of the difference between building up a bas-relief and working down a bas-relief, and thought the two panels exhibited formed a most instructive lesson in that respect. There was one question he should like to ask. His recollection was that in the panels between the pilasters Elmes left projections in relief in the stone, intended eventually to be carved. He had a strong recollection that, in early days, he had seen these standing out in relief, that they were cut away, and the sculpture executed in marble, which was no doubt more satisfactory to the sculptor, but did not increase the sculptural aspect of the building. That was the only criticism he had felt inclined to make. He believed the sculpture was intended by Elmes to be in the stone of which the building was constructed. Mr. Lee had spoken very strongly of the importance of light in which the sculpture should be seen, and had referred to the Parthenon. Now it had always been a great puzzle to him why the Greeks put a frieze in low relief right at the top of the wall, under the shade of the roof, where it could not be seen very far off. It was necessary to look up at it at an acute angle; there was no top light at all; and if Mr. Lee could give a reason why that was done, it would be a valuable piece of instruction. He had much pleasure in proposing a vote of thanks to Mr. Lee and Mr. Pomeroy for their very valuable papers.

Mr. G. Fellowes Fryne, in seconding the vote of thanks, remarked that the temptation of an architect was to see his work complete, and to consider that if he did not see the sculpture put in, it would never be done. He did not attempt to excuse that, but they had to face the fact that the expense of sculpture was the one thing which prevented its being used more often. Only the other day in Yorkshire he heard a peer say at a meeting that he had to go to Belgium for some sculpture, a crucifix or other figure for use in a reredos, which he had got for 107, and better executed than anything he had seen done in England. They had to face the fact that many of the moneyed classes here did not understand the value of sculpture in architecture, and when they did, the question of how cheaply it could be got arose. There was a rising school in this country who tried to thoroughly enter into the spirit of the architects. In sculpture, as in painting, and especially in ecclesiastical work, it was essential that the sculptor and painter should thoroughly enter into the feeling of the architect, and that he, in his turn, should have absolute sympathy with them. Mr. Lee had said that there could not be any really good work unless it told its own tale, and in Gothic as well as Greek work that was essentially the case. Clearly, Gothic work had its own direct meaning, the whole idea being symbolism from beginning to end. The beautiful idea in all sculpture was not to fill a given space with so much ornament, but to show the history that it told and the tale that it spoke. As Mr. Pomeroy had said, it seemed a mistake, and a mistake too often repeated, to put high reliefs in ceilings, which cast heavy shadows, and, especially with a centre light, gave an unpleasant and heavy effect.

Mr. W. D. Caroe said he had been struck by Mr. Lee's reference to light. One so often found in modern architectural figures placed upon buildings a number of small folds introduced on the surface of the draperies which took away from the bossy effect that sculpture ought to possess as a surface of light upon a shaded background. He was also very interested to hear Mr. Pomeroy refer to gesso, for which he (the speaker) had a great liking, especially in connexion with work which had to be painted. Mr. Pomeroy had referred to the fact that gesso was always best used in low relief, and he would like to know what he meant by that? In working with gesso which had to be painted, they got the direct work of the sculptor, without any intermediate processes. In reredos work in wood or stone it had to be moulded, cast, and carved, and the carved surface painted. For such a process gesso was sufficiently durable, and they were much more likely to see the sculptor's direct interpretation. He was at present using gesso for that purpose, attempting a relief of about



House at Enfield.

11 in., and he would like to know if Mr. Pomeroy thought it was possible or advisable. He could not quite agree with sculptors who wished to turn their plaster into other material. Plaster was one of the most charming materials possible, and he could not see why it should not be used more than it was, by way of figure decoration in the house, where it was not likely to meet with much hard treatment. In cases where it was necessary to employ cheap sculpture it was possible to get internal effects with plaster figures, which were quite as useful as if they had been executed in marble, and any process such as Mr. Pomeroy had described, by which the surface of the plaster could be so treated that it might be washed and properly preserved, was most valuable.

Mr. Pomeroy said it should be rather called stucco than plaster. Gesso was a material which was generally used in the sixteenth century for decorating leather-work, and was always most successful for flat work. Stucco duro would be the best thing to work in. The Italians cast stucco duro, and decorations and ornaments were added afterwards, the suction being stopped by applying a coat of shellac or something of the kind. The matrix should be of wax, as it would be rather slow in setting, and it was little more expensive, unless there was much under-cutting in the work.

The Chairman echoed the sentiments expressed by Mr. Lee as to the great advisability of architects and sculptors coming into close connexion with each other's work. He could not conceive that half the mistakes connected with Gothic carving would have occurred if architects had taken the trouble to ascertain the fact that the sculptor of the nineteenth century could not be expected to think as the sculptor of the eleventh or twelfth centuries did. The result had been that architects had designed beautiful churches, in accordance with all the principles of the Medieval revival, but had been compelled to get sculptors' apprentices to produce barbaric, ill-judged, and inartistic figures. If architects would get in the way of understanding how sculptors did their work and what they meant by it, and if sculptors would take the pains to understand how good architects did theirs, a great deal of the mischief from which they had been suffering would never have existed. In a building, which contained the finest work of Alfred Stevens, a magnificent sculptural opportunity had been practically let out to foreign "ghosts." This question was practically an architect's question, and they had the remedy in their own hands. If they had created the disease they still possessed the remedy. It was not necessary for the architect to wait until he got a building which would stand sculpture, as there were few of them who had not the opportunity of dealing with sculptured carving. Now architectural carving he would confine to billets and dentils, and to the things that the Quantity Surveyor could count, and the lithographer could sketch in the margin of the estimate. They should begin to regard the smallest bit of carving on a building as being sculpture, and see how truly any ornament gave an opportunity of ex-

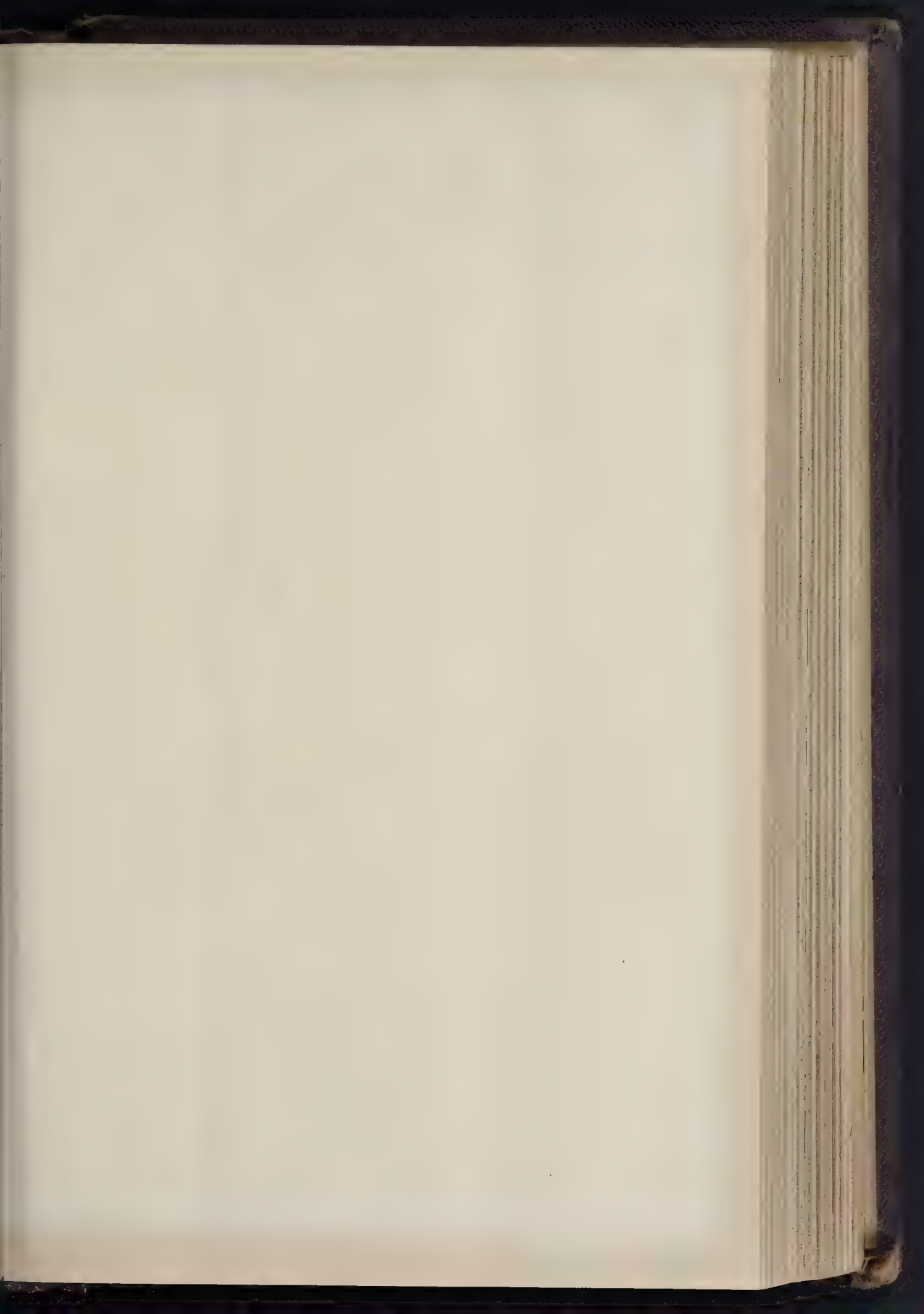
pressing some thought and idea in a scheme of decoration, consistently carried out, not only in bosses and strings, but in capitals and panels. They would not have to wait long before they had an opportunity of spending quite a sufficient amount to enable them to get good work. At the same time they should study, and sketch, and think out such carving for themselves. He was not altogether inclined to be pessimistic as to sculpture, and he did not think it need be prohibitively expensive. Since last he had attended these meetings a very great friend of all architectural students had passed away in the person of Dr. Reginald Poole, of the British Museum. Dr. Poole on one occasion said that the process of the purest and best Greek design appeared to be the process of eliminating every element not necessary to the perfecting of the work. This had been also expressed by Mr. Stirling Lee as the process of the sculptor, who eliminated all material down to the lowest point at which the artistic intellect was satisfied.

Votes of thanks were then accorded to Messrs. Lee, Pomeroy, and Young, and also to Mr. Pomeroy's assistant.

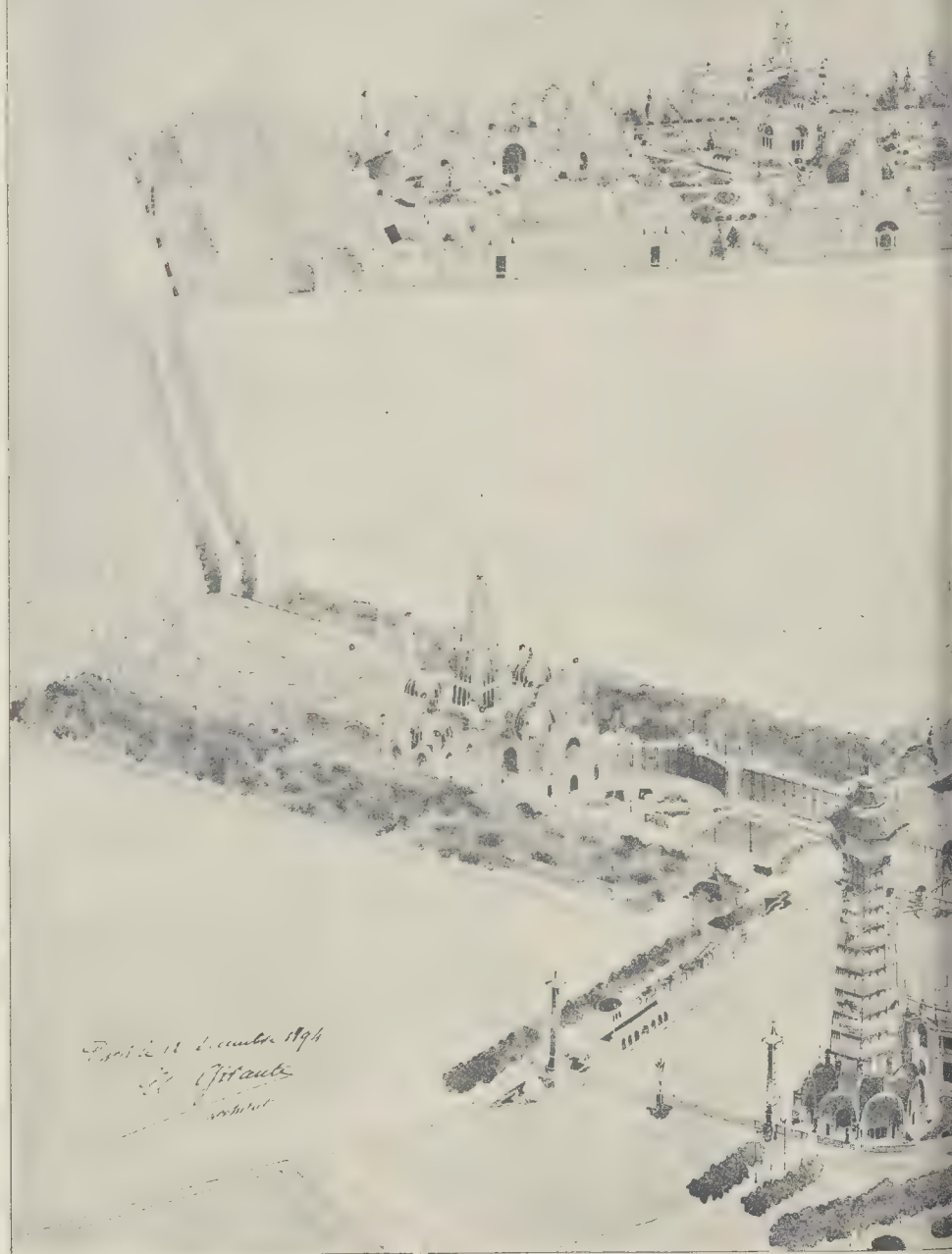
Mr. Lee, in replying, said that the stone used at St. George's Hall, which had been referred to, was not marble but Istrian stone. After careful thought, they found that where the Darley Dale stone was shelved, it was going in places. They then found the Istrian stone, which would stand for centuries, and which, at the same time, was nearly the same colour as the Darley Dale, and this enabled him to do his work more seriously. As to the Parthenon, the only thing one could feel was that the Greeks desired to make a record of their presentation of the Panathenaic Peplos, and they had to put it somewhere. The work did not tell as a relief, but it was a wonderful study of reflected light from the sculptor's point of view. The frieze was coloured in the background, so that, seen from underneath, the whole thing told as a colour-scheme of decoration. Whether it was put as a record, or to be used as a feature, he would not like to say, but it had solved the law of sight. He had brought the photo of Wells Cathedral to show the excellent scheme of decoration.

Mr. Pomeroy also returned thanks. What he had told them were matters of practical experience, and if any of his hearers wished for further information, he would gladly afford it at any time. The proceedings then terminated.

ARCHITECTURAL ASSOCIATION (DISCUSSION SECTION).—The eighth meeting of the session of the Discussion Section of the Architectural Association was held on the 6th inst. at 56, Great Marlborough-street, the paper read being one upon "Entrances and Doors," by Mr. Matt. Garbutt, A.R.I.B.A. The discussion was opened by Mr. Stockdale, and sustained by Messrs. Greenop, Brodie, and Tyars. The Chairman (Mr. W. Henry White) proposed a vote of thanks to the author, which was passed. Upon the motion of Mr. Satchell, a vote of thanks was passed to the A.A. Camera Club for the invitation extended



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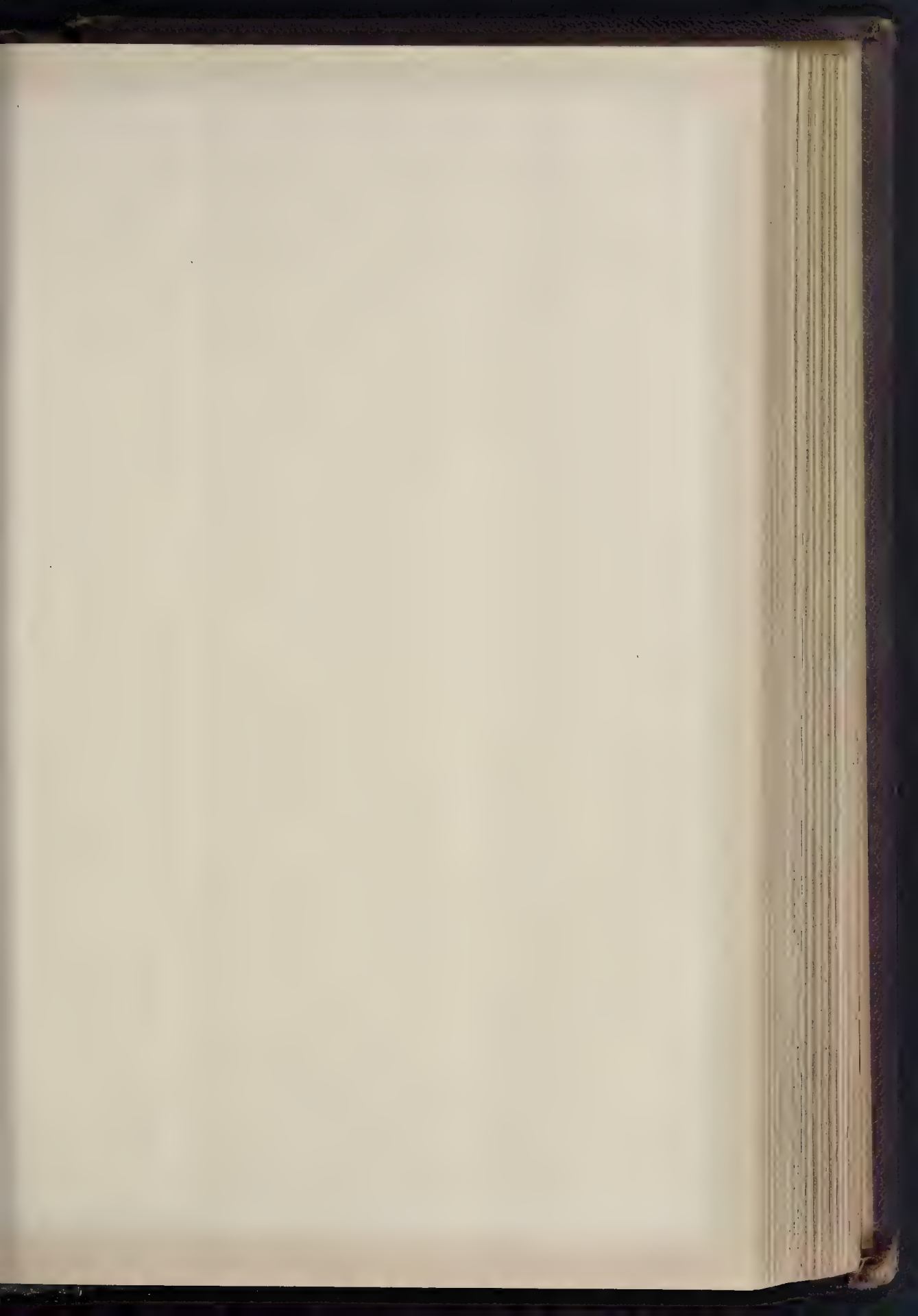
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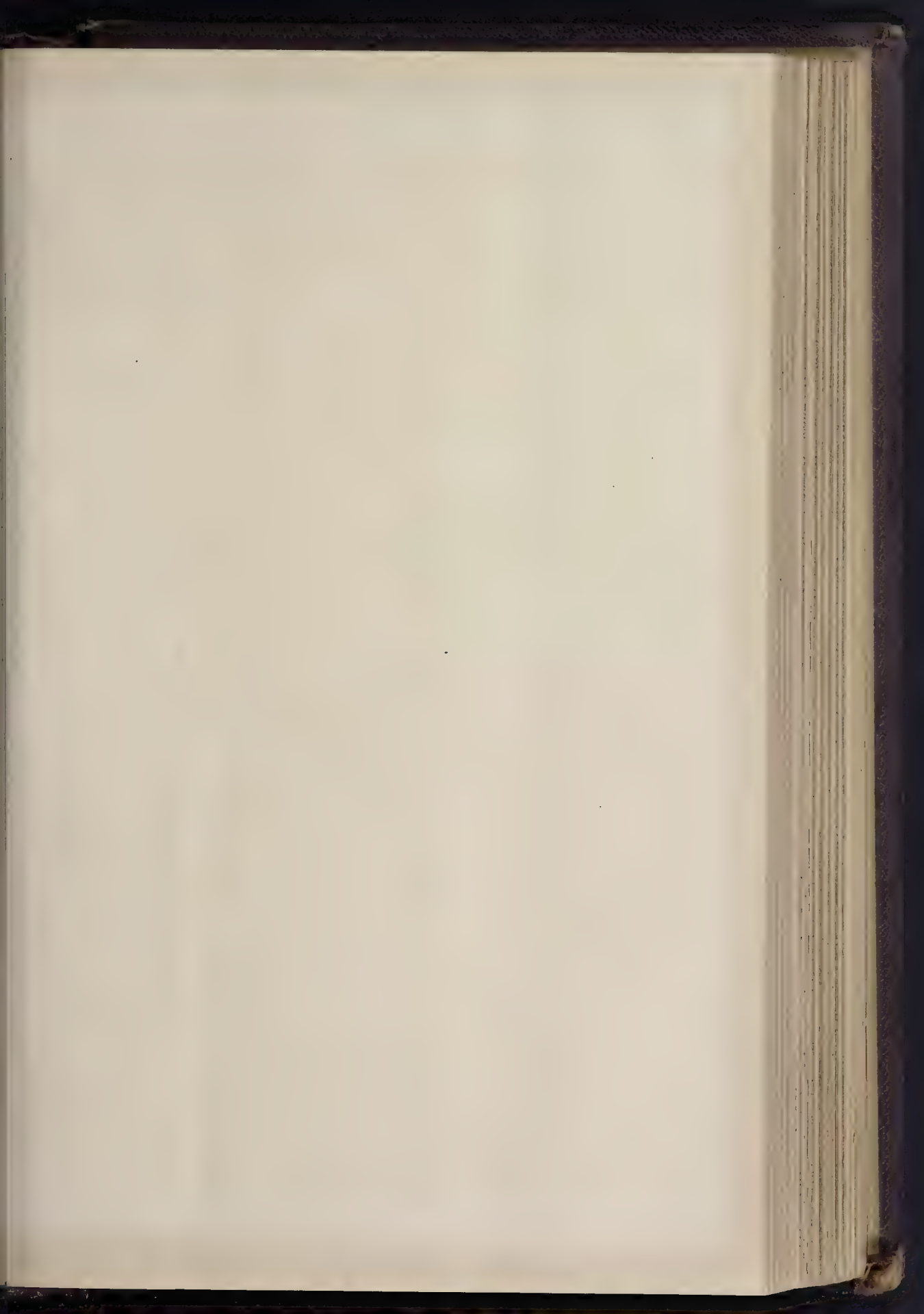
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1900 --By M. GIRAULT, ARCHITECT
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THE BUILDER, MARCH 9, 1895.



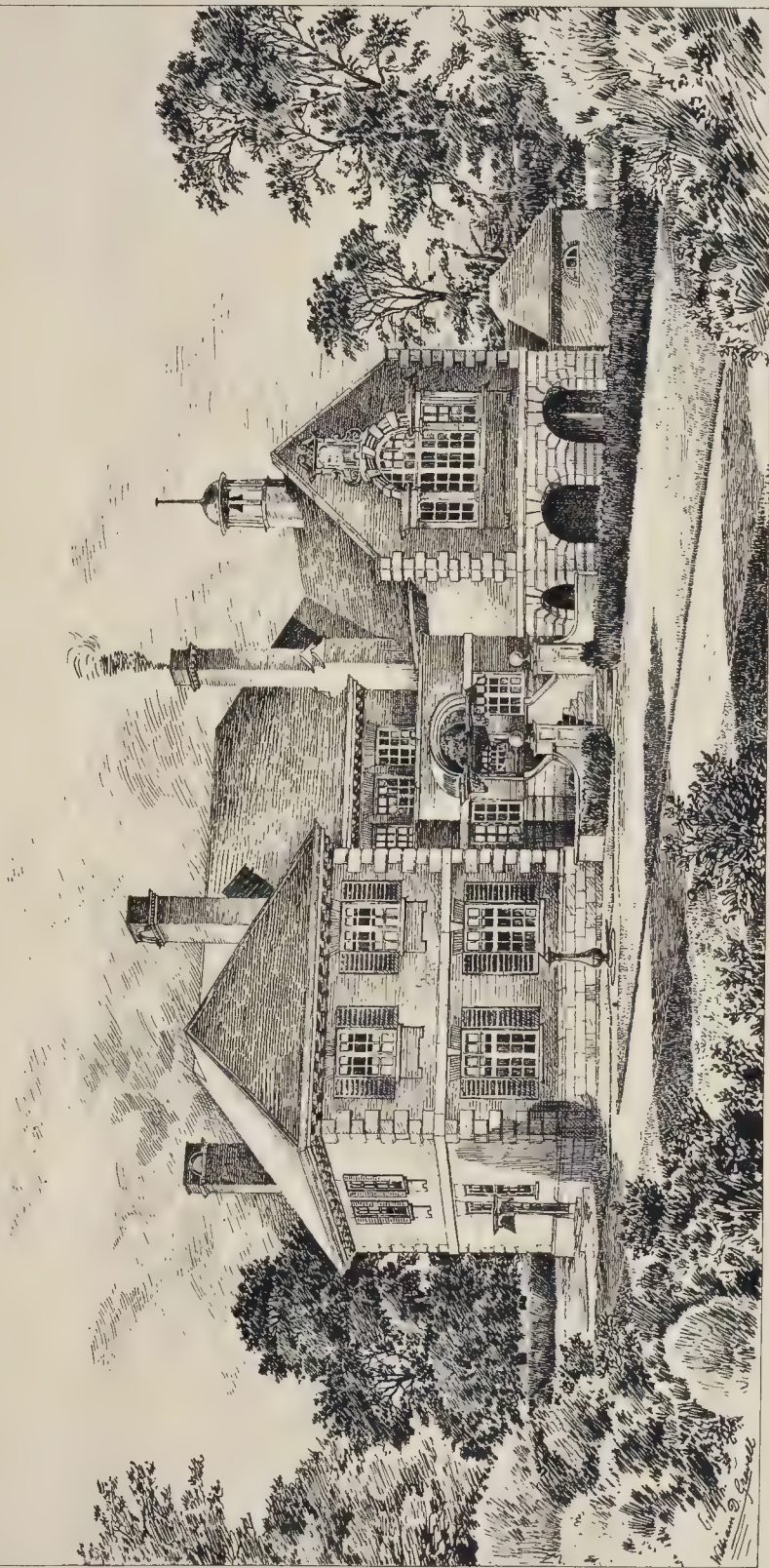


THE BATTLE MARCH 1891





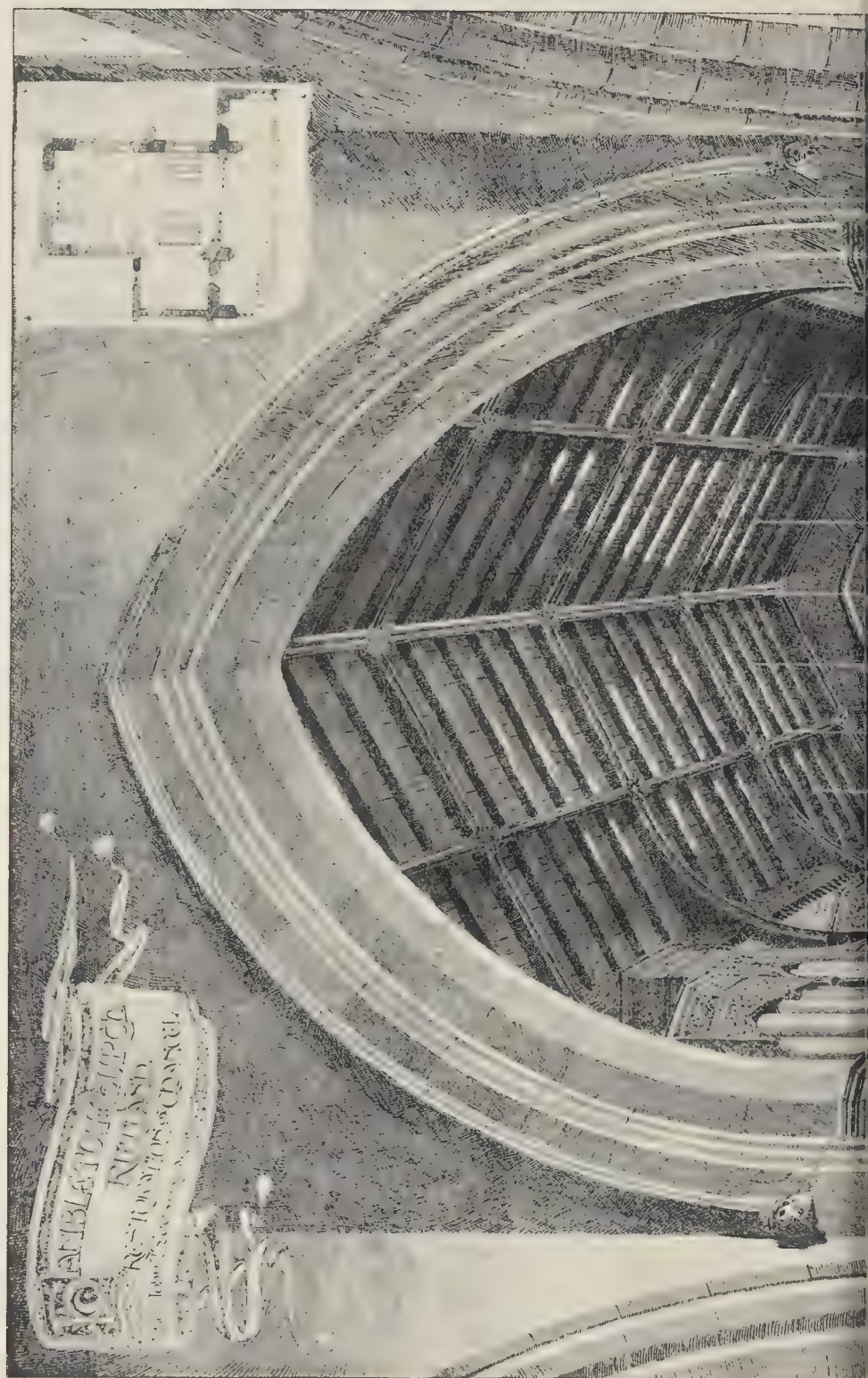
PRINCIPAL ENTRANCE, COUNTY COUNCIL OFFICES, WAKEFIELD
MESSRS. GIBSON & RUSSELL, ARCHITECTS.

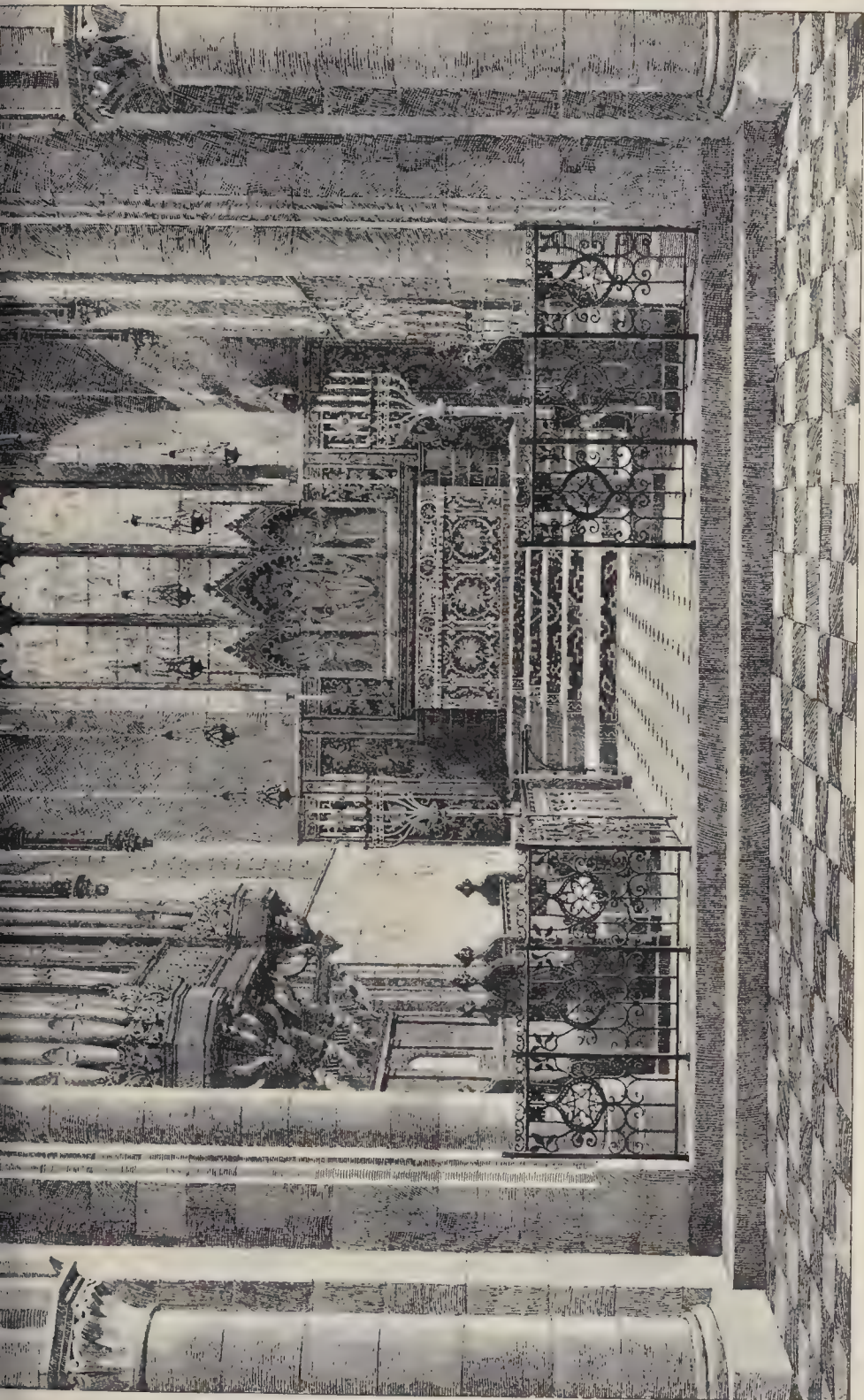


DESIGN FOR IRANLINGHAM GRAMMAR SCHOOL - MR W D GRAVELL A R I B A ARCHITECT

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THE BUILDER MARCH 9 1895





to members of the Discussion Section on the occasion of Mr. Arnold B. Mitchell's lecture on "Vaulting," on the 4th inst. The meeting then terminated.

Illustrations.

SCHEME FOR THE PARIS EXHIBITION OF 1900.

WE publish to-day the bird's-eye view of the design by M. Girault for laying out the Paris Exhibition of 1900. That of M. Girault, which we published on February 16, represented the type of design in which the Palais de l'Industrie was to be removed and rebuilt. This design by M. Girault represents a scheme for combining the Palais de l'Industrie, as it now exists, with the new buildings. This has been cleverly managed by the introduction of a circular building with a cupola, which forms the connecting link between the line of the Seine quay and the oblique line of the Palais de l'Industrie. It is probable, however, that the latter building will not be left *in statu quo*; and, indeed, at present it is in want of much more repair than it would seem quite worth while to give to a building which has nothing very much to recommend it except good lighting.

The third of the three 6,000 francs premiated designs we also had photographed, but it is so lightly drawn, and is so very decidedly a "bird's-eye view" (being, in fact, almost a plan) that it is hardly of sufficient interest to justify publication. The photographs of the premiated designs were made for this Journal only by our own photographer, and by the special permission of M. Bouvard, the superintending architect to the Exhibition.

HAMBLETON CHURCH, RUTLAND.

The restoration of the chancel of the above church includes a new chancel arch, screen, oak roof, side windows, sedilia and organ chamber, with all finishings as shown.

The East window is old, also the walls, which are strengthened by massive buttresses at the side, and at each angle of the East wall.

The reredos consists of a burnished gilt picty enclosing the subject of the Crucifixion in colour. The retable is of polished black Derbyshire marble, also the steps throughout, the floor being of Hopton Wood stone, and the lower part of the walls covered with *opus*.

The altar candlesticks, the candelabra altar rail, and sanctuary lamps are of burnished brass. The East wall is hung with hangings of yellow damask on a ground of green velvet, and with the altar frontals were embroidered by the Sisters of Bethany, who also made the altar linen.

The choir stalls are in oak and the chancel screen in wrought iron.

The lectern is in oak (three-sided), on one side having the Sacred monogram with "Colum terra transibunt," &c., on the other two sides the Alpha and Omega with "In principio erat verbum," &c., and a St. Andrew's Cross with "Sic erit verbum meum quod egredietur," &c.

The fald-stool, also in oak, has a top supported by spindles and inverted scrolls, similar in treatment to the lectern, but with the altar, the herubims and incense, representing the prayers of the Saints ascending up before God carved thereon in low relief.

At present the east window only has been filled with glass, but it is designed as a part of a complete scheme for the whole chancel. The idea to be represented is the Life of Victory, the Celestial, &c., the brightness of the Glory of Heaven above; with the Terrestrial, *i.e.*, the darker colouring of earth below.

The glass and finishings are by Mr. J. Egan, of Wells-street, Messrs. Cornish and Gaymer being the contractors, the entire cost of the working defrayed by Mr. W. Gore Marshall, of Hambleton House.

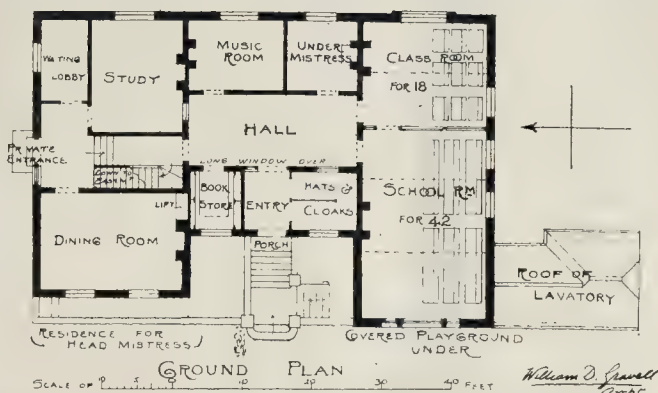
JOHN P. LEE.

BILLIARD-ROOM, "BLAWITH," GRANGE-OVER-SANDS.

The exterior of this house has already been illustrated in this journal. All the main rooms the ground floor are panelled from floor to ceiling. In the case of the billiard-room, the doorway, single-nook arch, and elliptical chimney-piece are of red stone, the ceiling moulded and modelled plaster, the woodwork oak.

The architects are Messrs. Willink & Thick-

FRAMLINGHAM GRAMMAR SCHOOL.



nesse, of Liverpool; the contractors for the woodwork are Messrs. Morrison & Sons, of Wavertree; the plasterwork is executed by Messrs. Goodall & Co., and the carving by Mr. Griffiths, both of Liverpool.

The drawing was exhibited at the Royal Academy of last year.

PRINCIPAL ENTRANCE, COUNTY COUNCIL OFFICES, WAKEFIELD.

THIS is the main entrance to the building erected from the designs of Messrs. Gibson & Russell, for the Wakefield County Council, a general view of which was published in the *Builder* for November 10, 1894, together with a description of the building, to which we refer the reader.

The drawing of the entrance, as well as the general view referred to, was exhibited at the last Royal Academy exhibition.

HOUSE AT ENFIELD.

THIS house is built on the slope of a hill, and the garden front overlooks the valley and distant country.

The ground story is built with red bricks, the upper story is in parts hung with red tiles, and the remainder half-timbered work, the roof being covered with brindle-coloured Broseley tiles.

The half-timbering is all constructional, the overhanging sill of upper story being moulded out of solid timber 12 in. by 12 in.

The plan and interior of the house was carefully thought out by a client who worked with the architect to produce the result he desired.

The whole of the ground floor is laid with wood blocks in various woods. The walls of the corridor and servants' offices are lined with salt-glazed bricks, the sinks, washing troughs, lavatories, &c., of white glazed pottery.

The joiners' work to the principal rooms is of oak, and the servants' offices of basswood, all polished.

The mantelpieces are of coloured glazed faience. On bedroom floor the joiners' work is of polished basswood.

The baths are of white glazed pottery with marble wall linings. Mantelpieces glazed faience.

The end of the bedroom floor is planned so that it can be isolated from the remaining bedrooms if necessary, and used as a sick-room, with nurse's room, bath, lavatory, and water-closet, and approached by a back staircase.

The builders were Messrs. Aldin, of South Kensington, and the architect is Mr. T. W. Cutler.

The drawing was exhibited at the last Royal Academy Exhibition.

DESIGN FOR FRAMLINGHAM GRAMMAR SCHOOL.

THIS was one of the designs submitted in competition some time ago for Mills' Grammar School at Framlingham, Suffolk. The accommodation required was a day-school for sixty girls and a residence for the head-mistress. The design shows a brick and stone treatment with tiled roofs.

The design is by Mr. W. D. Gravell, and the

drawing was exhibited at the last Royal Academy Exhibition.

DRAWINGS FOR THE ROYAL ACADEMY.

WE may remind our readers that drawings sent to the Royal Academy, and which the authors may wish to have published in our pages and in the *Builder* Album of Academy Architecture, will be delivered at Burlington House from this office (as has been done for several years past), if sent here in time to be photographed before sending in to the Academy. It is essential, however, that such drawings should be furnished with a label giving the title and author's name, attached to the frame by a cord, a similar label pasted on the back, and a letter to the secretary R.A., repeating the same information; in accordance with the Royal Academy regulations. *We cannot undertake to supply such labels if not affixed.*

The last day for receiving at the Academy is Monday, April 1st, and we cannot receive drawings here later than the previous Saturday morning. We should of course be glad to have them much earlier than that where possible.

MAGAZINES AND REVIEWS.*

In the *Art Journal* the article which will attract most general interest is that on Madame Millet, the wife, and now widow, of the great peasant painter, with a portrait sketch of her, and a sketch of their home, the former from a drawing by Millet himself. Mr. Davey concludes his article on St. Sophia, and Mr. Shaw-Sparrow continues his on paintings and sculptures as historic studies, in which, however, we seem still to be waiting for the real business implied in the title.

The *Studio* occupies a considerable portion of its issue over "The Art of Utamaro," a Japanese designer of colour prints, the illustrations of whose incapably-drawn figures are numerous, and overflow into the margins of Mr. Wedmore's article on the more interesting subject of Venetian Art. The time will come when people will wonder what possessed this generation to run after such childish figure-drawing as these Japanese examples. The whole number is as usual largely and well illustrated, though we find only a partial interest in photographic studies of foreground, and should prefer studies made by the hand of the draughtsman.

The *Artist* contains a good many interesting designs for textiles, book-plates, and other ornamental work, a reproduction of one of M. Heller's etchings, and an illustrated article by Mr. Henry Holiday on "Dress in the Millennium," carrying out Ruskin's idea that each profession or trade should have its own characteristic dress. Mr.

* The object of these notes is to point out anything in the contents of the current magazines which is of special interest to our readers, with occasional brief criticisms on the views expressed in such articles. When a magazine which has been sent to us is not noticed, it is because that number contains nothing that it is within our province to comment upon.

Holiday has however purposely made all his figures in the dress of the present day awkward or ugly in attitude and manner, and all the others handsome and graceful, which is hardly a fair statement of the case. We do not think the temper of modern society is ever likely now to approve of or sympathise with this kind of costume distinction, and it shows rather a short-sighted perception not to see that in the most cultivated society the tendency is more and more to take a man for what he himself is, personally, not for what his occupation is; and the habits of modern dress, in which distinctive differences are avoided, are the natural expression of this feeling.

We have received the January and February numbers (not the March one) of a new monthly antiquarian magazine entitled *Scots Lore*,* dealing especially with Scottish antiquities. Among the contributions is an interesting one, by Mr. P. M. Chalmers, running through both numbers, on "A Medieval Architect," John Morow, who left inscribed records of himself and his work at Melrose and elsewhere.

Blackwood's contains an exceedingly well-written and judicious article on "The Scottish School of Painting" in relation to the Grafton Gallery Exhibition. Considering that it is probably written by a Scotchman, and with the object of calling attention to Scottish painters, the moderate and discriminating tone of the criticism is the more remarkable. The author's remarks as to the landscapes of Thomson, of Duddingston, exactly hit the truth as to the real merits of these works and the extent to which they have lost interest at the present day.

The *Fortnightly Review* contains an article by Mr. Claude Phillips on "Venetian Art in the New Gallery," in which he remarks, as we did, on the possibilities existing in England for a really typical exhibition of Venetian painting of the highest class, instead of what has actually been seen, a heterogeneous collection of works of, in many cases, very doubtful value. The critical remarks on many of the pictures, and discussion of their authenticity, are written with knowledge and judgment, and are of considerable interest.

The *Nineteenth Century* contains a kind of mock-Medieval chronicle by Miss Emily Lawless, on "The Builder of the Round Towers" (in Ireland) suggesting how and why they were erected; it is mere romance, but well done. The same number includes an article by Sir J. C. Robinson on Rembrandt and Sir Joshua Reynolds.

In *Macmillan's* article on "The Transformation of the Black Country" gives some rather hopeful account of attempts to plant up some of the old spoil-banks and pit-banks in this desolate region of England, which we trust may meet with the success they deserve.

In *Harper's* article on the Industrial Region of Northern Alabama, by Mr. Julian Ralph, gives an account and illustrations (including some architectural ones) of a busy part of the world little known to most English people. The short article "An American Academy at Rome," by Mr. Royal Cortissoz, is a consideration of the necessity or wisdom of having another Villa Medici, for American students, as to which he seems rather doubtful. The article is accompanied by two illustrations of the Villa Medici, where so many eminent men among French painters and architects of this century have resided.

The *Century* contains an article on Peter de Hooch (or Hooghe) by Mr. Timothy Cole, and one by M. E. Hovelague on "Jean Carriès, Sculptor and Potter," whose works in bronze, wax, and pottery obtained a considerable and almost sudden reputation in the Salon of 1892. The illustrations of various heads modelled by him fully bear out the place claimed for him as a remarkable and original artist, especially the helmeted "Bust of a Soldier," which reminds one of Leonardo da Vinci. This talented artist, unhappily, died prematurely last year, and since the article on his works was written.

In *Scribner's* monthly article on American wood engravers deals with the work of Mr. F. S. King, whose delicate engraving "Flowers of the Air" forms the frontispiece to the number. A good remark of Mr. King's is quoted, to the effect that as we do not "look a picture in the face," but see it at a distance, with every detail blurred and harmonised, so the effort of the engraver should be to give "the effect of distance at close range."

Le Monde Moderne (Paris) is certainly one of the most comprehensive magazines of the day, in

regard to range of subject, including social, artistic, literary, musical, dramatic, and military criticisms, &c. The illustrations to the short article on "L'Ecole Nationale des Arts Décoratifs" do not give a very high idea of the state of decorative design in France, in spite of her extensive machinery for producing it. They show a kind of effort at prettiness, with no firmness of line or dignity of form, and the plant types used are not sufficiently conventionalised. We do not know whether these designs represent a type of work which is admitted in France, but they certainly would not be thought much of by English designers.

In the *Pall Mall Magazine* is an article by Mr. W. H. Mallock on "The Census and the Condition of the People," largely illustrated by diagrams, showing in a graphic form the proportion of employed to unemployed, the proportion of persons who live in one-roomed, two-roomed, and three-roomed houses, &c., &c. The object of the writer, as stated at the conclusion, is to show that overcrowding is an accident of our industrial system, not a necessary accompaniment to it, and that the tendency of things at present is towards a gradual but sure improvement in the condition of the people. Mr. Walter Besant's "Westminster" article in the same number is mainly concerned with political reminiscences, and is accompanied by several views of the Houses of Lords and Commons, internally and externally, before the fire which led to their rebuilding.

In the *Gentleman's Magazine* "Drops from the Clouds" is an article by Mr. W. W. Wagstaff, of some interest on observations of rainfall in recent years, with some remarks on the management of rain-gauges. An unsigned article on "Money-Making at the Tower," is a sketch of the history of the early days at the Mint.

The *Idler* contains a well-illustrated article of some interest on the working of a large passenger steamer, under the title "An Ocean Flyer."

THE ARCHITECTURAL ASSOCIATION SPRING VISITS:

ALL HALLOWS CHURCH, GOSPEL OAK.

THE third Spring Visit of the Architectural Association was paid on Saturday last to the Church of All Hallows, Gospel Oak. The party were met by Mr. James Brooks, the architect, who, in his preliminary remarks, said that he, in common with all architects, must feel proud when the Architectural Association deemed a building of his worthy of a visit. We have already illustrated this church, and given a description of it,* but the following notes are given in addition.

The south aisle is fitted up as a chapel, with a separate entrance by means of a narrow aisle. At the east end are two octagonal turrets containing staircases for access to roof and organ-chamber, which is situated over the north chancel aisle. The most noticeable feature, Mr. Brooks explained, was the vaulting, the aisles being carried up the whole height of the church; the ribs of the vaulting spring at a height of 28 ft. from the nave floor, from cylindrical shafts 2 ft. 6 in. in diameter. As eight ribs spring from every pier, each of these ribs is exactly one foot in width.

The visit proved most interesting, as not only did Mr. Brooks read a short account of the church before conducting the members over, but also he had the kindness to have the whole of the working drawings of the church, including the interesting vaulting details, placed up for the inspection of the members, and was kind enough to explain these in detail. The party were afterwards entertained at tea by the Rev. W. Matheson, thus bringing to an end an interesting and instructive visit.

THE SANITARY INSPECTORS' ASSOCIATION.

THE usual monthly meeting of this Association was held on the 2nd inst. at Carpenters' Hall, London Wall, when Mr. Thomas (Chairman of Council) presided, and Mr. Wilkinson, of the Derby Local Board, read a paper on "The Position of a Sanitary Inspector." Before the paper was read, Mr. Bath, who had a motion on the paper proposing that a memorial be presented to the Local Government Board, after being submitted for signature to all the Local Authorities and the sanitary inspectors in the kingdom, was

induced to postpone his motion until after the result was known of a deputation which the President of the Local Government Board had promised to receive on the 15th inst. on the same subject, viz., the assimilation of the tenure of office of sanitary inspectors and inspectors of nuisances with that accorded in the Act of 1891 to medical officers of health.

Mr. Wilkinson in his paper pointed out that sanitary inspectors had very little trouble with honest builders or house-owners who were open to persuasion to such an extent that 90 per cent. of the nuisances found to exist were abated simply on the initiative of the sanitary inspector, without legal process. It was the minority, consisting of unprincipled builders and dishonest house-owners, who gave all the trouble, and in dealing with such men the law at present gave the inspector a position really little better than that of an errand boy, for he could only report to the Local Authority and must wait, before acting, for instructions from a body over which persons to be proceeded against had too often a paramount influence. In the difficult struggle against this dishonest but powerful minority, the inspector was without protection in his official position. Inspectors—thousands of them—lacked security of tenure in their offices, and were subject to dismissal at the end of any year, without remedy or appeal. They had no recognition from the Central Authority, and no provision was made for loss of life or health in the discharge of duties, which brought them into daily contact with disease and death. The sanitary inspector who limited himself to inspecting and reporting would be a very inefficient officer, and the working classes, the very existence of whose families depended on the power of the workers to maintain their health and strength, would be the greatest sufferers by such a limitation. The inspector who discovered a nuisance and saw how it was caused, knew all that needed to be known about it, and if he knew his business he was the fittest person to see the remedial measures properly carried out. Inspectors had frequently to condemn work recently done under the supervision of other public departments. Proper inspection demanded the thorough testing of all appliances to find defects, and a similar testing of all new work before covering up. A register should be kept by the Sanitary Department of all drains and sanitary appliances, and power should be given to prevent alterations and additions without the consent and supervision of the department, which should deal with sanitary construction and inspection alone, in order to prevent jumble and overlapping. The question of the relative positions of the medical officer of health and the sanitary inspector in sanitary work was discussed in the paper. Before the passing of the recent Act, there were, outside London, 1,035 urban and 573 rural sanitary bodies, each with one or more inspectors and one medical officer of health, but while the great majority of the former were required to devote their whole time to their work, only about a score of the medical officers were required to do so by the terms of their appointment. Was it desirable, even where possible, for a consulting medical officer to climb down from his high position to take in hand detail work which could be better done, and at much less cost, by an officer having a more practical training? The inspector had no quarrel with the medical officer of health, and the lecturer had no hesitation in saying that if the superior officer would honestly give the inspectors credit for their own work, and be content to comment and advise thereon, there would never be the slightest friction, but the utmost loyalty, freedom, and goodwill between the two officials.

The usual vote of thanks was accorded on the motion of Mr. Scott Addison, seconded by Mr. Jones (Lambeth), and supported by Mr. Young (Battersea), Mr. Dee (Westminster), Mr. Darroet (Godstone), Mr. Kirk, and the chairman. In the course of the discussion a protest was raised on behalf of assistant sanitary inspectors against the assumption of all the credit and responsibility by many chief sanitary inspectors. Mr. Dee was of opinion that in one of the most troublesome questions of the time, that of "combined drainage," no difficulty need have arisen if the surveyors had done their duty. Had the administration of the law been left to the inspectors they would simply have carried out the details of the law, and there would have been no trouble. The vote of thanks having been put and carried, Mr. Wilkinson briefly replied to a number of the point raised, and the proceedings concluded with a conference on practical difficulties sometimes met with by sanitary inspectors.

* W. Hodge & Co., Glasgow; Elliot Stock, London.

* The Builder Dec. 29, 1894.

INSTITUTE OF BUILDERS (INCORPORATED):

ANNUAL MEETING.

THE eleventh annual general meeting of this Institute was held at the offices, 31 and 32, Bedford-street, Strand, London, W.C., on the 5th inst., Mr. Robert Neill, Jun., J.P., presiding. The Secretary, Mr. R. S. Henshaw, read the audited accounts, and the following report, which had been circulated among the members, was taken as read:—

In presenting their eleventh annual report the Council have to record with great regret the death of Mr. George Burt, D.L., J.P., an Honorary Member, who filled with distinction the office of President in the year 1888-9, and assisted materially in successfully establishing the Institute.

The London Streets and Buildings Bill promoted by the London County Council received the earnest attention of the Council, and it was considered desirable that the Institute should act in concert with the Central Association of Master Builders of London in opposing the Bill for the purpose of amending it. The Bill was referred to the Joint Parliamentary Committee of the two bodies, and the result can best be brought to the notice of members by the following report of the Joint Committee:—

"Petitions against the Bill were forty in number, and included the Surveyors' Institution, the District Surveyors, the Ecclesiastical Commissioners, the Duke of Westminster, the Associated Land Owners and Leaseholders, the Corporation of London and the Commissioners of Sewers, and several of the Vestries, the School Board for London, the Fire-wood Merchants and the Advertising Contractors. Twenty-five different Counsel appeared before the Select Committee, and amongst the opposing parties the interests of the builders appeared to be more identified with the interests of the property owners, and your Committee were able in many cases to act in concert with them, and, by joint action, to establish a strong and successful opposition. . . . Of the ninety-one amendments submitted by your Parliamentary Sub-Committee sixteen were rejected, thirty-seven accepted as proposed, and the other thirty-eight were either accepted in a modified form or rendered unnecessary in consequence of the acceptance of other amendments. . . .

The revision proposed by the Bill of the existing enactments relating to streets, roads, and building sites, were of the most drastic and confiscatory character; those relating to new undertakings being much more stringent than the existing law, but those relating to rebuilding would in the majority of cases have been simply prohibitory and were evidently intended to be so, and the principle which had hitherto existed, and allowed a person to act without consent of the authority so long as there was no infringement of the law, was intended to be superseded, and no one was to be allowed to do anything except with the consent of the London County Council first obtained. Your Sub-Committee asked to have the old principle continued in the new Bill, but were not successful; they, however, in conjunction with other petitioners, succeeded in getting a reasonable restriction as to the way in which the London County Council is to exercise its right of approval, which is now embodied in the Bill in the following form:—"Within two months after the receipt of any such application the Council shall either sanction the plans or give notice to the applicant of their disapproval thereof, stating fully all their reasons for such disapproval. Provided that within the said period of two months the Council shall give notice of their disapproval of any such plan or section they shall be deemed to have given their sanction thereto." It will be seen from this clause that an obligation has been imposed on the London County Council which is entirely new, and is that they are to give their reasons for disapproval, which is an advantage to the applicant, and will enable him to revise his scheme and know how to do so to remove objections, and the consequential result in the event of the proposal not being adjudicated upon within two months is also new and in the interest of the applicant, and in reference to all cases of rebuilding, except in houses to be inhabited by persons of the working class, existing rights are conserved, whereas the proposals in the Bill as first drawn they were entirely swept away.

One of the provisions which gave the London County Council the right to withhold their consent to the formation of any street with a gradient of less than one in thirty was amended on the motion of our Committee to one in twenty.

The provisions relating to the stacking of timber are no longer clear, and the ambiguities have been cleared up and removed, and existing rights preserved.

Important provisions in relation to adjoining properties, party-walls, &c., are enacted, some of them new, and the whole of these received the careful attention of your committee and the solicitor and counsel, and important revisions were made at

their instance, not only upon matters of principle, but in relation to procedure and general administration.

Important modifications were made in the amount of penalties as proposed. The scale of fees to District Surveyors which was put forward was of a voluminous and complicated character, and has been amended, and the ambiguity with reference to the work of which a District Surveyor is entitled to have notice, has been removed, for it would have been difficult to say if anything at all could be done without notice.

A great deal of amendment was necessary, too, in the definitions and general forms of procedure, and many inconsistent and contradictory points had to be dealt with, and the action of your counsel met with support and consideration, and resulted in great improvement. Your Committee gave great consideration to the question of the powers which the London County Council sought to obtain in the matter of making by-laws, and in the result the almost unlimited authority which they endeavoured to obtain has been restricted, mainly on the action of your Committee, to the power to make by-laws subject to the provisions of the Act, and the by-laws before confirmation are to be sent to the Institute of Builders, thus giving to the Institute the opportunity of making any representation they may consider advisable to the Local Government Board before they are sanctioned, and it is important as being for the first time a statutory recognition of the Institute as a public body. An important point has been gained by ensuring that nearly every decision of the London County Council and the general jurisdiction of the District Surveyors is subject to appeal to the Tribunal of Appeal, though the efforts of your committee to secure the appointment by the Institute of a member of the Tribunal were not successful. The Constitution of the Tribunal has been considerably modified, and consists now of only three members, one appointed by the Royal Institute of British Architects, one by the Institute of Surveyors, and one by the Secretary of State, and your Committee secured an important provision in relation to the fixing of the fees of the Appeal.

Important amendments were made in the schedule relating to the component parts of mortar and concrete, broken bricks being allowed in opposition to the wishes of the London County Council.

Perhaps the most important amendment carried by your Committee was that relating to the principle of Compensation wherever payable under the Act, which has been now made in conformity with the Statute Law.

Having regard to the very substantial amendments which had been made by the Select Committee of the House of Commons, your Sub-Committee, after carefully considering the Bill in its amended form, did not consider they would be justified in incurring the expense of a petition to the House of Lords in view of the comparatively small number of points to which they could usefully object.

Under these circumstances they prepared a memorandum which was communicated to the opposing landowners and public bodies explaining the points which in their view still required amendment, and offering to give evidence before the Committee of the House of Lords, an offer which was to some extent made use of by the opposing landowners.

With some further important amendments the Bill passed in the Upper House.

The negotiations between the Standing Committee for Practice of the Royal Institute of British Architects and a Committee of the Council on the proposed conditions of contract, have been continued during the year, but no agreement has yet been arrived at. The subject is most difficult and complicated, and while the Council are quite alive to the necessity of stringent provisions being necessary in a building contract for the protection of the employer, yet they feel it is equally important to secure adequate protection of the builder against the arbitrary and inconsiderate use of these powers by those in whom they are vested. The Council are unable, at present, to report a satisfactory conclusion, and unwilling as they are that the time and trouble which have been spent in the protracted negotiations come to an end without any settlement being arrived at, they are certain that it is better so, than that a form of contract should be arranged which would not be satisfactory to them or one that they could recommend for general adoption, or that would be likely to be generally accepted.

In accordance with the Articles of Association the President, Mr. Robert Neill, Jun., one of the Vice-Presidents, Mr. John M. Burt, the Treasurer, Mr. George Plucknett, one of the Auditors, Mr. George Burt, and three members of the Council:—Messrs. Woodman Hill, Colin G. Patrick, and S. Wheeler, retire, but are eligible for re-election. Mr. H. I. Sanders also retires from the Auditorship and does not seek re-election.

It was resolved, "That the report and accounts be received and adopted." Mr. John Mowlem Burt was elected President for the ensuing year; Mr. Henry Holloway, a Vice-President; Mr. Geo. Plucknett, Treasurer; Mr. Geo. Burt, Mr. Henry Gough, Mr. B. E. Nightingale, and Mr. Samuel Wheeler were elected ordinary members

of the Council; Mr. J. W. Duffield and Mr. Benjamin Hannen, jun., being elected auditors.

The meeting closed with a vote of thanks to Mr. Robert Neill, jun., for his services as President during the past year.

ARCHITECTURAL SOCIETIES.

EDINBURGH ARCHITECTURAL ASSOCIATION.—On the 2nd inst., the members of the Edinburgh Architectural Association paid a visit to the New Royal Observatory, which is nearing completion on Blackford Hill. The company were joined at the Observatory by Mr. W. W. Robertson, H.M. Board of Works, President of the Association and architect of the building, and Professor Ralph Copeland, the Astronomer Royal for Scotland. Mr. Robertson gave a short description of the main portions of the building. He said that in 1888 Lord Crawford of Balcarres offered to give his whole astronomical equipment at Dunecht, including the library, which contained over 15,000 volumes, as a gift to the nation. This gift necessitated the erection of a new Observatory. The site chosen had the advantage of being free from the smoke and haze of the city, and Professor Copeland had by means of minute experiments proved that the Observatory would be perfectly free from vibration. The buildings included the Observatory proper, the Astronomer Royal's house, houses for the assistants, and a gate lodge for the mechanic, as well as stabling accommodation. The T shape of the buildings had been chosen in order to give the Observatory a clear outlook, so that the instruments could be placed in such a position as to sweep the whole horizon round. Then the Transit House, which was one of the most important portions of the Observatory, was placed about 80 ft. from the main building. The first reason for that was in order that they might keep the meridian line clear from the other buildings. A covered way connected it with the main building, because it was absolutely necessary to good observing that the observer should reach his work dry-shod. The walls of the Transit House consisted of two thicknesses of metal with an inner and an outer covering of corrugated iron. The most complete arrangements were made to maintain an equal temperature, which was a very important consideration in such a place. Turning to the main building, Mr. Robertson said that the largest of the two domes was intended for the large Equatorial telescope from Dunecht, and the smaller dome would contain the smaller equatorial from Calton Hill. He pointed out that the disposition and character of the building was entirely governed by scientific and not architectural considerations. The main work-rooms of the Observatory were in the principal front facing the north. After walking round the building, the company entered the Transit House, where Professor Copeland said that the purpose of the department was simply for observing the time of day from the sun or from the heavenly bodies. The piers for the large instrument to be used in the room were of Dunecht granite, and weighed about 15 tons. The library, designed to contain 20,000 volumes, was inspected, and afterwards the party visited the various rooms of the building.

ENGINEERING SOCIETIES.

THE INSTITUTION OF CIVIL ENGINEERS.—At the Ordinary Meeting of this Institution on the 5th inst., Sir Benjamin Baker, K.C.M.G., Vice-President, in the chair, two papers, dealing with the Transmission of Power by Electricity, were read. The first, on "Electrical Haulage at Earnock Colliery," was by Mr. Robert Robertson, B.Sc., M.Inst.C.E., the second being by Mr. Robert Hay, M.Inst.C.E., and was entitled "Water-Power applied by Electricity to Gold Dredging."

THE INSTITUTION OF JUNIOR ENGINEERS.—On the 23rd ult. a very large number of the members of this institution availed themselves of the opportunity kindly afforded by the President (Mr. Alexander Siemens) for visiting Messrs. Siemens Brothers and Company's manufactory at Woolwich. Special arrangements had been made for their guidance over the works, which cover an area of 7½ acres, and the occasion was rendered exceedingly interesting in every way. The new and old dynamo shops, the milling, bobbins, fitters', and rubber shops, the central power and lighting station (all the machinery is driven by electric motors), the switchboard erecting room, the cable shop, tank houses, lead cable shop, cable-testing, instrument calibrating, and showrooms were seen.—On the 1st inst. a meeting of the Institution was held at the Westminster Palace Hotel, Victoria-street, Mr. Young

We have been compelled to omit some portions of this part, for want of space.—E.D.

presiding, when a paper on "Locomotive Repairing Work" was read by Mr. A. H. Newsam Smith (member), of the Great Northern Railway repairing shops, King's Cross.

THE CIVIL AND MECHANICAL ENGINEERS' SOCIETY.—A lecture was delivered on the 28th ult. by Mr. A. S. E. Ackermann, before the Civil and Mechanical Engineers' Society, on "Testing Machines and the Testing of Materials." The lecturer entered fully into the principles governing many of the various and well-known testing machines, and pointed out the good qualities, faults, and difficulties of working with them. Various methods of gripping and holding the specimens to be operated upon were described. This was followed by details being given of the proper method of shaping the specimens, and of measuring and recording the results obtained, and the instruments used for this purpose, particular attention being drawn to several extensometers, particularly those of Professor Unwin. Explanation was given of certain laws that it was well those making tests should bear in mind in working out results. The lecture was illustrated by samples of metals and woods that had been tested.—On the 2nd inst. this Society visited the works of the New City of London Brewery, in Upper Thames-street, E.C., and the works of the Waterloo and City Railway, now in course of construction. The members were conducted over the brewery by the company's brewer, Mr. J. B. Kibble, and their engineer Mr. W. T. Harris. The brewery is an old established one, and contains a large amount of machinery of considerable interest to engineers; the better part of the old machinery has been kept, and this is combined with modern machinery and apparatus. The members first inspected the pumping engine and well, the latter, owing to the continual lowering of the water level under London (which is at the rate of one foot a year in the neighbourhood of this brewery), has been deepened and altered considerably since it was first sunk; the particulars of this were pointed out by Mr. Harris by the aid of drawings showing various sections of the well and the strata through which it passed. Those present were then shown by Mr. Kibble the whole of the brewing process from the taking in of the grain to its final sampling. Afterwards the party proceeded to the Waterloo and City Railway works, over which they were shown, in the absence of Mr. Hay, the resident engineer, by Mr. Knowles, the contractor's engineer, who explained in detail the work that was being done, and the method of carrying it out. The length already completed of one of the tunnels, there being two, is a quarter of a mile, and their diameter is 13 ft. each. Mr. W. R. Galbraith, M.Inst.C.E., and Mr. J. H. Greathead, M.Inst.C.E., are the engineers to the scheme, and Messrs. J. Mowlem & Co. are the contractors. The machinery used is of modern date; the works are lighted by electricity, both above and below ground, and an electrically driven locomotive conveys the spoil from the face of the heading to the central shaft, where it is raised and deposited in barges alongside. The shaft, which is in the river, enables the work to be carried on without disturbing in any way the thoroughfares under which the railway burrows, and there is a considerable saving in the cost of construction by this method of working.

NEW WORKS OF REFERENCE.

WE have received from the publisher the thirteenth annual issue of "The Electrician Electrical Trades' Directory and Handbook for 1895" (London: Salisbury-court, Fleet-street, E.C.), which consists of three divisions—the handbook, the directory, and the biographical. The work contains a great deal of information of use to electricians and others, and we may specially mention the articles on "Patents, Designs, and Trade Marks," "Digest of the Law of Electric Lighting," and the section devoted to short biographical notices of well-known men in the electrical world, in thirty-one instances a portrait accompanying the notice. The directory contains electric light rules and regulations of various authorities. The directory division of the work contains an alphabetical list of 7,500 names of companies, firms, and individuals.—From the office of the *Local Government Journal* (Dorset-street, Fleet-street), we have received a copy of the "Local Government Annual and Official Handbook for 1895." This is the fourth year of publication of the work, which is so full of useful information relating to local government bodies, that it is not easy to find the diary. As a local government directory, it is both

complete and up-to-date, and can safely be recommended to those interested in local government. It is to be obtained for 1s. 6d.—We have received from Mr. Henry Sell, of Fleet-street, the fifteenth annual issue of his "World's Press," which contains 17,000 editorial entries, and 3,700 separate newspaper announcements. The work, in addition, contains a lengthy article on British Trade, 1880-1893, and interesting articles on such subjects as "The Teaching of Journalism at the American Universities," "System in Dealing with Contributed MSS.," "Our Political Caricaturists" (with illustrations), "New Editors in 1894," "Obituary of 1894"—the two last being accompanied by portraits, "The Law of Libel as it Affects Newspapers," by Mr. W. Blake Odgers, Q.C., and other articles. The new issue is so complete that the work might be called an encyclopedia of journalism, and one idea of its compiler has evidently been to make it handy for reference. Several maps are given with the work, which is not only of use to the journalist, but must be of interest to the general reader.

TRADE CATALOGUES.

MESSRS. COLLEGE & BRIDGER, of Wolverhampton, send us an illustrated sheet of their locks. The mortise lock and roller-bolt mortise lock, of which sections are given, appear, as far as one can judge from description and illustration, to be very strong and well-constructed locks. The sheets contain illustrations and notes as to other types of locks, and also door furniture, which latter has the merit of being in good taste and without that over-ornamentation, which is the usual mistake in these cases.

Correspondence.

I the Editor of THE BUILDER.

CREWE SANATORIUM COMPETITION.

SIR,—In accordance with the invitation of the Health Committee of the Crewe Corporation, I inspected the designs sent in for the above competition, and after a protracted examination drew up the report, which I forward you herewith.

As appears therefrom, I recommended as the best design one sent in by Mr. Hampden Pratt, under the motto, "Up to Date." The Committee, however, decided to award the first premium to another design sent in under the same motto by Mr. Geo. Bolshaw. This gentleman, I understand, is connected with Crewe. I cannot but think that the better way would have been to appoint him as architect from the first, rather than invite designs from gentlemen who had not the advantage of acquaintance with the locality. In passing, I may say that both Mr. Pratt and Mr. Bolshaw are strangers to me, and that the seal of secrecy provided by the mottoes was not broken, for me, at least, until the award was published.

In view of the unsatisfactory result of this competition I have resigned my office of assessor in the competition invited by the Technical Instruction Committee of the Crewe Town Council.

FRANK GRANGER.
The following is Mr. Granger's report, which he wishes us to publish:—

"TO THE CHAIRMAN AND MEMBERS OF THE HEALTH COMMITTEE OF THE CORPORATION OF CREWE.

GENTLEMEN,—In accordance with your instructions I have examined the designs sent in for the proposed Sanatorium, and I beg to submit my report herewith.

The designs number sixty-three, and have been made by about the same number of competitors: in one or two cases alternative designs have been furnished by the same architects. A large proportion of the plans display great ability on the part of their authors. I have gone through the whole of the designs and reports, and have arrived at the conclusion which I lay before you, only after a careful balancing of the merits and demerits of the various schemes. Let me take one by one the tests that I have applied.

Conformity with the instructions issued December 24 and January 10 last by the Medical Officer of Health.

These have been followed by nearly all the competitors.

Fitness of the plans for the specific purposes of an Infectious Diseases Hospital.

I have excluded those designs which failed to comply with the recognised rules of hospital arrangement. For instance, in some cases the quarantine or observation wards communicated with the main pavilions.

Having thus put on one side those designs which

were unsuitable altogether, it became possible to consider the important question of economy. This regards first the prime cost, second the cost of administration.

(a) *Prime Cost.*—I beg to point out for your careful consideration the manner in which the various estimates that accompany the plans have been arrived at. Some competitors have priced out their designs at a figure which is altogether inadequate to the character of the work they propose. On the other hand, one or two estimates are considerably in excess of the probable cost of the respective designs. In coming to this conclusion, I have been guided by my own knowledge of the relative prices of construction in London, Crewe, and other provincial towns.

I have given preference to those designs in which the accommodation required was provided with the greatest economy of space and construction. Some good designs were handicapped by the extravagantly large administration blocks. Then, again, elaborate and expensive elevations seem to me to be distinctly misplaced in a public hospital.

(b) *Economy of Administration.*—It is desirable that each nurse shall have under her immediate supervision all the wards in which her duties lie. Hence her duty-room should be so placed as to command all her wards. Some plans would need for their due administration a permanent addition to the staff of three or four nurses, whereas the plans I recommend to your notice can be administered properly without such addition. The annual charge for one extra nurse would of course represent a very large sum if capitalised.

Nearly all the plans for which the estimates were very high have proved to be unsuitable, in spite of their elaborate character. On the other hand, I have discovered fatal objections to some plans in which the authors had sacrificed their plans to an unnecessary simplicity. I am bound to say that, with one or two exceptions, to which I shall refer later, most of the designs with very low estimates were entirely unsuitable for execution.

At the same time, although I have not been guided exclusively by considerations of cost, I have chosen those plans by preference in which efficiency was combined with economy.

The designs which I consider to be the best are the following, taking them in their alphabetical order: 'Experience,' 'Stamp,' 'Up to Date' (2), and 'Up to Date' (3). With your permission I will now proceed to compare these four designs in detail.

The site offers facilities for future extension, and space can be left without cramping the proposed buildings, or interfering with the due circulation of air. The two plans marked 'Up to Date' are about equal in this respect. 'Stamp' is also good. At the same time 'Up to Date' (3) has shown larger extensions than the Local Government Board regulations admit, keeping in view the nearness of his other blocks and of the boundary wall.

The Scarlet Fever Pavilion should be placed on the east side of the site in order that the prevailing winds, which are from the south-west, shall not spread infection to the other buildings. 'Up to Date' (2) and 'Stamp' are the best in this respect. Dr. Thorne recommends that the main wards should have their side windows facing somewhat to the south of east and north of west. This arrangement is also best adapted to the site in respect of the prevailing winds and for the arrangement of the drainage. 'Up to Date' (2) and 'Stamp' have this arrangement.

The observation and discharging blocks should be carefully isolated from the main ward pavilions. 'Up to Date' (3) has placed his observation block too near the boundary and to the main Scarlet Fever Pavilion.

Single bed wards are provided to both main pavilions by 'Up to Date' (2) and 'Stamp.' 'Experience' has suggested them, but does not include them in his estimate. 'Up to Date' (3) provides them to one ward only.

'Up to Date' (2) and 'Experience' have the best plans in this respect. 'Stamp' provides a receiving room: this is not desirable.

The four selected plans adopt the best, namely, the east position. 'Up to Date' (2) fails, however, to provide a separate laundry for staff.

The Typhoid block should have its drainage kept as far as possible separate from the other drainage. There should be a provision for the flushing of the drains. 'Experience,' 'Up to Date' (2), and 'Stamp' provide for this in different ways. 'Up to Date' (3) shows a drain plan in which the Typhoid drainage intercommunicates with that of other blocks.

The wards are proposed to be heated with central stoves, supplied with fresh air by underground flues.

In addition, low-pressure hot-water pipes are arranged round the walls. 'Stamp,' however, shows his fireplaces at the end of the wards. The foul air is extracted by means of shafts from ceiling level.

The modes of construction recommended by 'Experience' and 'Up to Date' (2) are of similar character, and would involve a like expense. I am of opinion that the estimate of 'Experience' is inadequate, and that of 'Up to Date' (2) is excessive, and that the two plans would cost the same amount in execution. 'Up to Date' (3) specifies modes of construction somewhat more expensive than 'Up to Date' (2) and 'Experience.'

'Stamp' has sent in an excellent design, but in view of the excessively high figure at which his estimate stands, I am unable to recommend this design for execution. At the same time the general excellence of his work deserves special recognition, and I beg to recommend him for the second premium.

I have felt some difficulty in appraising the design, inasmuch as he has given alternative arrangements which are not always compatible. His design and specification reveal a considerable amount of practical experience, and his plans have been very carefully thought out. I regret that his elevation is not so satisfactory as his plan. I must advert to the mode in which the cubical contents of his buildings have been attained. He only shows footings to the depth of one foot or thereabouts below the ground level, and as far as I can judge, his dimensions have been taken from there.

'Up to Date' (2) calls for adverse criticism in only one particular, namely, the absence of a special staff laundry. His design is, to the best of my judgment, the most economical of the three. I have reached this conclusion after a careful examination of his specification. The exterior, although simple, would have a very pleasing effect.

'Up to Date' (3) would prove more expensive in execution than either 'Experience' or 'Up to Date' (2). He has provided for future extension very successfully. But for the reasons already pointed out, his plan could not be carried out as it stands. Further, he has made arrangements for his drainage scheme which are altogether unsatisfactory in comparison with those of 'Experience' and 'Up to Date' (2).

As a result of the examination of these three plans I come to the conclusion that 'Up to Date' (2) is the most satisfactory in point of fitness of arrangement, and the most economical of the three.

In laying my report before you, I desire to acknowledge, with especial emphasis, the assistance I have received from Dr. H. Jones. His wide acquaintance with hygiene in all its branches has enabled me to satisfy myself on many important points in which I could not have trusted my own unaided judgment.—I remain, Gentlemen, your obedient servant,

FRANK GRANGER."

THE FIRM OF PALEY & AUSTIN.

SIR,—In your Notes in the *Builder* of January 26 this sentence occurs: "Mr. Austin had been, we believe, a pupil of Messrs. Sharpe & Paley." I shall be obliged if you will allow me to correct this as I had the privilege of being a pupil of my brother, Mr. T. Austin, and of Mr. R. J. Johnson, of Newcastle-on-Tyne, and afterwards of being in the office of Sir George Gilbert Scott for several years before I came to Lancaster to be Mr. Paley's assistant.

HUBERT J. AUSTIN.

The Knoll, Lancaster, March 4, 1895.

CARTAGE v. RAILWAY TRANSIT.

SIR,—Manufacturers are sometimes subjected to very serious loss of trade through being unable to obtain promptly rates of carriage from their works to places where their customers require to use the goods, notwithstanding that the destination has a railway goods depot, and that the traffic is offered at full truck-loads and at "owner's risk" in transit. Recently a London firm of merchants wanted a "rate" in railway transit at Poplar. The traffic manager at sending wrote that Poplar would probably be 50 per cent. more than to London only.

W.R., Paddington office, reply that "no rate exists," and that "the traffic can be conveyed much cheaper across London by cart to Poplar."

I presume that if the traffic were offered from ship to Poplar, rates of cartage would be found between that point and any railway depot in England. My customers have been waiting three weeks for a definite reply, but unless they will cart across London the trade is taken out of my hands in face of the fact that the sending railway company has a depot at the required destination.

Surely this is a question for railway shareholders, seeing that it is necessary to have consistent rates of carriage to enable manufacturers to fully develop and extend their trade.

My firm can put hundreds of tons more traffic on the railway yearly at their works if their interests are considered in the matter of railway carriage rates.

Rates are often prohibitive, and I am assured that by firm's traction-engine can deliver our goods at 100 miles from the works, by road, cheaper than the cost of railway transit at existing rates. This will doubtless be put to practical test during the coming summer.

REUBEN CULL,

(Agent for Charlton Lime Company).

London, March 6.

The Student's Column.

BRICKS AND TERRA-COTTA.—X.

BASIC BRICKS.

WE have seen that in order to render a tolerably pure siliceous earth suitable for the manufacture of fire-bricks it is necessary to add a small proportion of lime or other similar material as a flux. Silica, in itself,

is infusible, and the lime was to be added in such proportions as would just melt it. Then, in the last article, we discussed the relative proportions of ingredients of known chemical composition to be mixed with certain classes of brick-earth to render it fusible but not fluid. Now we shall say something concerning the ingredients and manufacture of bricks composed almost entirely of lime, or basic bricks as they are termed. These are used for lining Bessemer converters and cupolas, amongst other things.

The practice of making lime bricks dates back several years, and it is only in comparatively recent times that an altogether satisfactory product could be obtained. Lime, as we know, is infusible, but it never exists on the large scale without forming part of some compound, and is usually found as the carbonate. In conjunction with carbonate of magnesia it constitutes the substance known as magnesian limestone. An almost insuperable difficulty exists in the manufacture of bricks of such materials in that, on heating, carbonic acid is driven off, leaving the base behind; and naturally, the material as a whole loses considerable weight and shrinks very much. It is estimated that the loss of the acid, plus moisture dried out, leads to its reduction in weight of from 40 to 45 per cent., and the shrinkage is from 25 to 35 per cent. To use either limestone or magnesian limestone satisfactorily, therefore, was impossible.

Neither could quicklime be employed without special preparation in the manufacture of basic bricks, as it will not mix with water without a strong chemical reaction taking place, moreover it is too pulverulent in its character to ever become plastic in the strict sense of the term. Nevertheless, with other fluids than water it becomes more tractable. It occurred to Mr. Edward Riley, about 16 years since, that if some cheap fluid could be employed that had no chemical action on the lime it would be possible to mould the latter either by ramming or by pressing it into moulds. Various liquids were tried in turn, such as crude petroleum oil, coal oil and resin oil, all of which answered very well. In burning, the petroleum, &c., passed off, leaving bricks of solid lime. When this material is burned at a low to a bright red heat no contraction takes place, when subjected to a much higher temperature, however, it contracts to a small extent. Mr. Riley experimented with many varieties of lime and experienced no difficulty in making perfectly solid bricks and cylinders. The only precaution necessary was to see that the lime was well burned, and that it had not been exposed long to a damp atmosphere.

The next step was to ascertain the effect of other solid mineral substances on the lime; and various mixtures of burned clay and iron oxide were dealt with. In the end it was found that from 5 to 7½ per cent. of burned clay made the lime, &c., much harder after burning. An admixture of from 3 to 5 per cent. of oxide of iron was also found to consolidate the lime, whilst it increased the shrinkage.

In the manufacture of bricks, the lime was at first submitted to a pressure of about one ton per square inch. That used was obtained from Huddlestone stone, a magnesian limestone of much repute for building purposes. Direct experiment showed that it was far preferable to use hydraulic pressure than to pound the material in a mould, as this latter process rendered the upper part of the brick rather scaly. Basic bricks made from ordinary Sheffield lime may, when burned at a high temperature, be steeped in water without slaking. The following is the chemical composition of bricks of that lime after burning:—

Chemical Composition of Basic Bricks.

Silica	8.85
Lime	51.80
Magnesia	35.35
Alumina	2.60
Peroxide of iron	1.40
Calcium sulphide .....	.55
	100.55

The bricks being pressed perfectly true and square, can be built almost without mortar or other cement for the joints.

GLASS SAND BRICKS.

It has recently been ascertained that a very superior quality of brick may be manufactured from the waste sand derived from grinding and polishing plate-glass, in the United States and elsewhere. The grinding of plate-glass is accomplished by means of wooden plates covered with iron, between which and the glass to be ground quartz sand, abundantly moistened with water, is brought. By this method, the quartzose grains become mixed with par-

ticles of iron and glass, and, after losing its sharpness, the material is cast aside as waste. The sand is found to contain "about 15 per cent. of glass particles and 2 per cent. of iron, is very hygroscopic, and, before it can be used for making bricks, is dried, and then pressed into the mould under a pressure of 660 lbs. per 155 sq. in. This material is then subjected to a temperature of over 2,500 deg. Fahr., when the glass enters into combination with the sand. The bricks thus produced have a specific gravity of only 1.5, and are perfectly white; and, as they are not materially affected by acids, are of much use in chemical factories and sulphuric-acid works.

Glass "bricks" are now being manufactured in Switzerland, formed or moulded flask-shape with a short neck at each end. They are 8 in. in length, 6 in. in width, and 2½ in. in depth, with an air-hole or chamber running through the centre. The edges of the brick are covered, recessed or ribbed and grooved to receive, when laid, a suitable cement of plastic material of such character that, after it has hardened, it will constitute a suitable frame or setting to keep the entire mass, roof or wall, solidly together. They are of sufficient strength to withstand a pressure of from 150 lbs. to 200 lbs. per square foot.

IRON BRICKS.

A new product, called "iron brick," comes from near Saarbrück, Germany. It is made by mixing equal proportions of finely-ground red clay-slate with fine clay, and adding 5 per cent. of iron ore. This mixture is then treated with a 25 per cent. solution of sulphate of iron, together with a certain quantity of finely-divided iron ore. It is then moulded in a press, dried, dipped once more in a nearly concentrated solution of sulphate of iron mixed with the finely-divided ore, and then baked for forty-eight hours in oxidising flame, and twenty-four in the reducing flame. The bricks are said to be highly satisfactory for special building purposes; the German governmental testing laboratory has reported very favourably on them.

KIESELGUHR BRICKS.

These somewhat novel materials, which have been in the London market for a few years, are made from infusorial earths, and although primarily intended as fire-bricks, are, on account of their low specific gravity (0.6) of much use for vaulting and the like, also. They are especially valuable for blast-furnace pipes, covering retorts, &c., and have been employed with much success in chemical works and other buildings where non-conducting properties are desirable. A cubic yard of Kieselguhr brickwork weighs about 12 cwt., about ½ the weight of that made of ordinary fire-bricks. The following is a chemical analysis of this infusorial earth:—

Chemical Composition of Kieselguhr.

Silica	83.8
Lime .....	.7
Magnesia .....	.8
Alumina	1.0
Oxide of iron	2.1
Organic Matter	4.5
Moisture and loss	7.1
	100.0

From the above, it will be seen that the bricks are of a highly siliceous nature. We have had no opportunity of examining the raw earth, but if it is correctly described as "infusorial" (which might have about the same chemical composition as that above given), it would be made up chiefly of the frustules of diatoms, a very lowly-organised group of marine plants, which possess siliceous skeletons.

SLAG BRICKS.

These are not bricks, if that term be restricted to burned or roasted products; at the same time, a few words on slag "bricks," which have been extensively employed in some parts of the country, will not be out of place. They have been made in large quantities at Middlesbrough by a process which may be briefly described as follows.

Slag is run off from the furnace into a machine in which water keeps up a constant circulation, and, by being brought into direct contact with the water, the slag is immediately converted into sand. This is mixed with a certain quantity of siliceous lime, with an addition of iron oxide. The preparation of the lime forms an essential part of the process. It is made in the following manner, though we do not know whether the precise proportions have not been modified during the past few years:—80 per cent. of unslaked common lime, 10 per cent. of raw

* "Mineral Resources of the United States." 1893. p. 668.

gypsum, and 10 per cent. of iron oxide calcined. These are all ground into a fine dry powder, after which the composition is passed through a sieve of very fine mesh. To each 1,000 bricks 6 cwt. of this composition is used. It is then passed into a brick press, and the bricks are subsequently removed to air-drying or hardening sheds. No water is added before the material is pressed, sufficient being held in suspension, as it were, in the slag sand to thoroughly moisten the lime. In fact, it was no uncommon thing to find that a small stream of water flowed from the press as a result of the squeezing to which the sand was subjected.

The bricks thus produced are very tough, though they might merely be regarded as a form of cement. As a matter of fact, with the exception that the bulk of the material is made of slag-sand instead of sand produced by Nature, we can see no difference between these "bricks" and cement blocks that have been compacted by pressure. They are chemically composed as follows:—

Chemical Composition of Slag Bricks.

Lime	29.90
Silica	25.15
Alumina	21.80
Protoxide of iron.....	1.44
..... manganese .....	.26
Peroxide of iron	1.66
Magnesia	5.10
Potash .....	.53
Soda .....	.36
Sulphur	1.00
Sulphuric acid	1.25
Phosphoric acid .....	.01
Carbonic acid	2.60
Water	9.50

Less oxygen of the lime combined with sulphur .....	.50
.....	100.06

It is not difficult to see that the slag-sand was essentially composed of silicate of alumina, plus small proportions of lime, magnesia, and sulphur. The material, being spongy, is very compressible; but the principal point to be attended to in the manufacture of slag-bricks is great care in mixing the lime in definite proportions with the sand—too much lime tends to burst the bricks, whilst too little materially affects the hardening.

Many other kinds of "bricks" are made from refuse of manufactories, but generally on a small scale, the works, as a rule, being of a somewhat ephemeral character.

OBITUARY.

REV. EDMUND VENABLES.—The Rev. Edmund Venables, perceptor and canon residentiary of Lincoln, died on Tuesday. The deceased was a well-known archaeologist, and he wrote extensively on architectural subjects as well.

Mr. J. H. POWELL.—The death is announced of Mr. John Hardman Powell, the artistic head of the firm of Hardman & Co., of Birmingham. Mr. Powell was a pupil and afterwards son-in-law of Augustus Welby Pugin, who was associated with the late John Hardman in the Gothic revival of 1855 and subsequent years. Mr. Powell, who carefully preserved the spirit and traditions of his masters, was especially happy in window designs. Among his best works are windows in Worcester Cathedral, St. Chad's and St. Martin's, Birmingham, and the church recently erected by the Duke of Norfolk at Norwich.—*Leeds Mercury*.

MR. ALFRED GILES.—Mr. Alfred Giles, C.E., died on the 3rd inst. in his 70th year. In 1889 he was vice-president of the Institute of Civil Engineers.

GENERAL BUILDING NEWS.

PROPOSED HYDROPATHIC ESTABLISHMENT, RHYL.—A syndicate of Manchester gentlemen have purchased a quantity of land on the Morwyla Estate at Rhyll, on which it is intended to erect a hydropathic establishment. Messrs. Darbyshire & Smith, of Manchester, are the architects, and the contract has been let to Messrs. W. Brown & Sons, of Salford.

NEW CHANCEL, CHRIST CHURCH, LINTHWAITHE.—The new chancel of Christ Church, Lintwhaithe, was on the 2nd inst. consecrated by the Bishop of Wakefield after undergoing considerable alterations and improvements, which, together with the new chancel, have been carried out from designs and plans by Mr. C. Hodgson Fowler, of Durham. The cost of the addition and alterations, including a new organ, is about a 500l.

INFIRMARY, FAISLEY.—The plans of a new infirmary for Paisley have been prepared by Mr. T. G. Abercrombie, architect, Paisley. The building is to be erected on a site at Egypt Park, Caliside, and will generally consist of two stories and attics, with the front portions of the wings, and also the

central block, slightly jutting out from the main building. The long part of the main building on the ground floor, running from east to west, is to contain the corridors. In the centre of this main building there is to be an administrative block, at which will also be the main entrance, and the projecting wing at the east end will be of the form of a rounded building, containing circular wards, whilst a smaller building at the west wing will have the sick nurses' rooms on the ground floor and the doctors' bed-rooms above. On the north side of the circular building, there will be circular wards for twelve boys, with duty-room, day-room, bath-room, &c., and a ward containing sixteen beds for female medical cases is to be on the ground floor with recreation rooms, verandah, &c., and on the south side of the corridor there is to be a circular ward containing twelve beds for girls, having all the ordinary conveniences. A small structure is to project from the corridors between the central and western pavilions, and it is to contain, on the ground flat, doctors' and nurses' dining-rooms, a chapel and chaplain's room being on the first floor. The spaces between the three pavilions are to be preserved as airing-grounds for the patients, the males and females having separate grounds. On the ground plan of the central or administrative block there will be the vestibule and hall, porters' rooms, visitors' room, and doctors' room, and leading from the hall is a stair to the board-room, committee-room, and sitting-rooms on the first floor. A structure which forms part of this block has the casually ward on the basement floor, the matron's apartment on the ground floor, and on the first floor will be the operating-room, the anaesthetic-room, and testing-room for the medical men. Entrance to these various apartments will be from the corridors. In the attics, which will be confined to the main line of building, the servants' rooms, kitchen, &c., are to be located. The cost of the hospital, which is expected, be over 60,000l. In addition to the hospital, a nurses' home is being erected within the grounds.

CHURCH SCHOOLS, ROCHDALE.—The New Parish Church Schools at Rochdale were opened on the 2nd inst. The new buildings, which are from the designs of Mr. Henry Lord, of Manchester, are situated near the railway station, at the corner of Lower Tweedale-street and Coventry-street, and they provide accommodation for 468 boys and girls. Seven class-rooms are arranged on either side of a central hall, 74 ft. by 31 ft., and at each end the teachers' rooms, cloakrooms, and lavatories are placed. The structure is carried out in red brick and terra-cotta. Exclusive of the site, which has been presented, the cost of the building and furniture amounts to 7,435l.

HIGH SCHOOL FOR GIRLS, BRINTON.—A new school for girls has just been opened in Waverley-road, Streatham Hill. The new buildings include, beside separate class-rooms for all forms, a large hall, kindergarten-room, studio, laboratory, and music-rooms. The school has been erected under the supervision of the architect (Mr. J. Osborne Smith), by Messrs. W. Johnson & Co.

HALL, COATDIKE, LANARKSHIRE.—On the 2nd inst. the new hall erected by the Good Templars of Coatdyke was opened. The hall, which was designed by Mr. Thomas Smith, architect, Coatbridge, is in the Renaissance style, and has sitting accommodation for over 400 people. There are the usual ante-rooms and lavatories on the ground floor, and above these is a reading and recreation-room.

THE THEATRE ROYAL, GLASGOW.—It is proposed to erect a new theatre on the site of the Theatre Royal, Glasgow, which has just been destroyed by fire. Mr. Phipps visited Glasgow a few days ago, and made a thorough examination of the theatre, with the view to preparing plans for the new building. At a full meeting of the directors it was arranged that Messrs. Howard & Wyndham shall construct a new theatre on the site of the Theatre Royal, Glasgow, and hand it over on completion to the company.

FOREIGN AND COLONIAL.

FRANCE.—The fifth exhibition of the Société Internationale de Peinture et Sculpture has just opened in the Georges Petit Gallery.—At the Musée Galliera an interesting Exhibition has been opened of seventy-eight portraits of women painted by masters of the French school, such as MM. Bonnat, Bouguereau, Carolus Duran, Gervey, Roybet, Jules Lefebvre, &c.—An extra-parliamentary committee has been commissioned to take in hand the organization of the services of "Bâtiments Civils," and Palais Nationaux.—A Hôtel de Ville has been built at Levallois Perret, at a cost of 8,000,000 francs.—The "Gueset" Railway Company has demanded, in connexion with the 1900 Exhibition, a concession to make a new line between Courcelle, Passy, and the Champ de Mars, intended to duplicate the line from Auteuil.—The Lyons Fine Art Society will open its annual exhibition on April 8, to close on June 9. The exhibition is open to foreign as well as French exhibitors.—The Municipality of Lyons has sent to Chamounix an expedition of engineers of the Ponts et Chaussées Department to inquire into the possibility of getting water from the Arve, and from other sources among the glaciers of the Alps, to be taken to Lyons by an

aqueduct system.—The work of consolidating and strengthening the Temple of Diana at Nîmes is now completed. The repairs were carried out under the direction of M. Revoll, the architect acting for the Commission des Monuments Historiques, with care to avoid any unnecessary interference with the architecture of the temple. The ancient building has been made the receptacle for a curious collection of remains of statues, &c., sent by M. Perrot.—The monument executed by M. Rouilleux, sculptor, to the memory of President Carnot, for the Place de l'Hôtel de Ville, at Nîmes, consists of a white marble pedestal, decorated with symbolic objects, and an inscription, surmounted by a group representing the President at the moment when he received the fatal blow. Behind is a figure of France receiving him into her arms.—The death (at Paris) is announced of M. Albert Porcher, landscape painter, and a pupil of Lanbini, who had been a constant exhibitor at the Salon for the last twenty-five years.

—We have to record also the death of M. Maurice Antonin Dormoy, architect at Bar-sur-Aube, at the age of 73. He was at first attached as architect to the Department of Assistance Publique, at Paris. He was also one of the architects to the "Monuments Historiques," and connected for a long time with the Société Centrale. The Department of Fine Art at Paris will shortly send to Lyons the paintings by Léon Comerre to decorate the Salle des Fêtes of the Prefecture of the Rhône. These paintings include a ceiling representing the Triumph of Venus, two tympanum subjects, one representing the Rhône and the Saône, the other the City of Lyons, enthroned, and attended by Arts and Industries, a view of the city of Lyons forming a background to the whole.

MISCELLANEOUS.

A SOCIETY OF SANITARY INSPECTORS.—A meeting of representatives of several societies of Sanitary Inspectors for the purpose of considering the question of the formation of a Society of Sanitary Inspectors embracing London and the Provinces, was held at Stafford on February 23. The following societies were represented: North-Western Liverpool, Manchester, Yorkshire, Western, and Staffordshire. Dr. Reid occupied the chair, and resolutions were carried unanimously to the effect that a Society of Sanitary Inspectors, embracing London and the Provinces, should be formed, the chairman and secretaries of the various bodies represented at this conference, and also the chairman and secretary of any other sanitary inspectors' society approving of the movement, should be elected as an organising committee to prepare a scheme for the formation of the new society, and frame rules and regulations for its government, which should be embodied in a report to be presented for approval at a general meeting of members of the various societies to be held at a place and time to be determined by the committee; and that, with a view to the absolute unity of the Sanitary Inspectors of the kingdom, the secretary forward a copy of the resolutions passed to the secretary of the Incorporated Association of Sanitary Inspectors, and to the secretary of any other inspectors' association, the existence of which he might become cognizant of.

ELECTRIC LIGHTING.—The new printing works of the Geraldine Press, 21, Whitefriars-street, Fleet-street, E.C.4, and also the block of offices belonging to the same, at 22, Whitefriars-street, E.C.4, are now lighted throughout by electricity, the current being produced in the basement of the works of the Geraldine Press by a compound wound direct-current dynamo, built by Messrs. Crompton & Co., and driven direct by an engine made by Messrs. Belliss & Co., of Birmingham. About 100 lamps have been installed in the works, and about 50 lamps in Tudor-street, and the lighting of both premises is controlled from one switchboard fixed close to the dynamo. The large Hoe machine used for printing "Answers," and also the Marconi machines used for printing the large number of other papers published at the same offices are lighted up internally by incandescent lamps which thus facilitate work. The wiring of the buildings was carried out by the Electrical and General Engineering Co., of 86, Leadenhall-street, E.C., under the supervision of the Consulting Engineer. Mr. E. R. Dolby acted as Consulting Engineer for the whole.

REPLY LETTER CARD.—A convenient letter card has been brought out by Messrs. Beesching & Son, which in its first state forms a sealed letter for the question, while a portion of it is perforated for tearing off and using as a postcard for the reply. The advantage is that the question is sealed, the card forming a halfpenny packet open at the ends (opened by the usual perforation method); the answer alone is open.

A NEW SET-SQUARE.—Mr. F. R. Lawson, of Fenton, Staffordshire, sends us a new set-square, which he has patented, made of transparent kylonite. By means of two slits cut in this, wide enough for a pencil to work through, the same set-square will give three different angles, 60 deg. (or 30 deg.), 45 deg., and a 1 deg. pitch for roofs, these being the three angles most in use. To make one set-square do the service of three is certainly an economic benefit to draughtsmen.

THE "SANITARY" SINK COVER.—Messrs. Leete, Edwards & Norman send us a specimen of this invention, which consists of a perforated galvanised

metal conical cap for the top of a sink, waste, or rain-pipe, in which is fixed a block of material of a disinfecting character, by which it is proposed to disinfect liquid passing down and air passing up, one block is sufficient for about two months' use, and can be renewed at a cost of 6d., 1s., or 1s. 6d. per half-dozen blocks, according to the size of cover required.

PAINTERS' DISPUTE IN DOUGLAS, ISLE OF MAN.—A dispute as to wages is going on between members of the Douglas Operative Painters' Association and the masters, originating in a demand about five months ago by the former for an increase of wages during eight months of the year from sixpence an hour, and the existing rate of wages to be retained during the other four months, owing to the masters wishing to enforce certain rules which were objected to by the men, it was resolved at a meeting of the Painters' Association on February 17 to strike on March 1, failing the concession of the masters to advance.

APPOINTMENT OF VALUER.—The Local Government Board have officially appointed Mr. James W. Weatherall & Green, London, as valuer under the Manchester Corporation Act, 1844.

BUILDING TRADES COMPETITIONS.—It is understood, says the *London Technical Education Gazette*, at in connexion with the forthcoming Building Trades Exhibition, to be opened on March 25 at the Agricultural Hall, there will be competitions among British workmen in the following trades—masonry, tinsmithing, carpentering, joinery, plastering, smith's work, plumbing, decorating, &c., and that silver and bronze prize medals will be awarded to the successful competitors. The arrangements for the competitions have been made by a committee of architects, and the prizes will be nominated by the Royal Institute of British Architects, the Worshipful Company of Plumbers, the Institute of Builders and the City of London Association. The competitions will take place on Saturday, March 30. Particulars may be obtained from Mr. H. Greville Montgomery, of 222, Strand, W.C., who will also make special arrangements for the admission of members of classes in building construction and the building trades to the exhibition on receipt of applications from the secretaries of the schools.

THE JEWRY WALL, LEICESTER.—The new line of the M. & S. & L. Railway Company through Leicester may, says the *Leicestershire Advertiser*, under the destruction of the Jewry Wall necessary, the matter has been taken up by those who desire to preserve such a historical relic, and pressure is being brought to bear on the company and the Corporation. At the annual meeting of the Leicestershire Architectural and Archaeological Society the question was considered, and on the proposition of Mr. Freer, seconded by the chairman (the Rev. A. Rendell), the following resolution was carried unanimously:—"That the Manchester, Sheffield, & Lincolnshire Railway Company and the Leicester Corporation be memorialised to preserve the Jewry Wall intact, and that the committee and hon. secretaries be empowered to take any steps that may be necessary in order to preserve this interesting relic of Roman Leicester."

HOLYROOD ABBEY AND PALACE.—On the 28th, Mr. W. W. Robertson, of H.M. Board of Works, delivered a lecture on "Holyrood Abbey and Palace," in Queen-street Hall, Edinburgh, under the auspices of the Photographic Society. Mr. Robertson described (1) the ruined fragment of the old abbey, now known as the Chapel Royal; (2) the tower built by James IV. of the old palace; (3) the palace erected by Charles II., representing the bulk of the buildings. One great charm of the ancient Abbey was, he said, that most of what is to be seen was genuine old work. The speaker was face to face with the old buildings. Mr. Robertson next described the other two portions of the buildings, and said their surpassing interest lay in the way in which they linked the Scotland of two centuries long past.

THE FUTURE DEVELOPMENT OF PLUMBING.—Peter Fyfe, chief sanitary inspector of Glasgow, delivered a lecture recently, in the Waterloo Rooms, Glasgow, under the auspices of the local District Council of the National Registration of Plumbers. The subject of the lecture was "The Plumber: His Present Position and Future Prospects." After mentioning that there are in Glasgow 239 master plumbers, employing 862 apprentices, Mr. Fyfe said a plumber from being a tradesman had become a health protector or a health destroyer, and it was usually drawing on the minds of men in authority that, careless plumber work involved not discomfort only, but might be death to the citizen. One should be entrusted with work who had not full knowledge of its principles. The present position of the plumber in that respect was admittedly unsatisfactory. Speaking of the part he expected plumbers to play in future developments, Mr. Fyfe gave a description of the steam-heating system in New York, where the charge for heating 1,000 cubic feet of space during 182 days of the cold season was 5s. 6d. In this country system could be worked supplying the heat at thirds less price. At present the cost of heating one apartment by coal in an open fire was 1s. 10d. It was time for capitalists and municipal authorities to look at this great question of

central steam stations, both for sanitary and financial reasons. Mr. Fyfe also outlined a system under which the city refuse at present burned might be utilised in electric lighting, and described the use of compressed air for motive power at present in operation in Paris. In the development of these systems in this country the plumber, he expected, would play an important part. In the future prospects of the plumber lay embedded in great measure the realisation of the dream of to-day—the city of comfort and health. Mr. Fyfe was thanked for his lecture.

THE CASTLE BROMWICH ROADS.—The Castle Bromwich Rural District Council have called in Mr. J. E. Wilcock, C.E., of Birmingham, to prepare plans, make an inspection, and report on the whole of the roads in the several parishes within the district, with a view of ascertaining the state of the roads and what repairs are necessary to be done before they are taken over by the Council.

DIOCESAN SURVEYORSHIP OF ST. ALBANS.—We seem at last to be in possession of the facts in regard to this appointment, about which we have received conflicting accounts. It now appears that there were two vacancies, to one of which, Mr. Trevor Davys, as already stated, has been appointed, to the other Mr. A. Blomfield Jackson; but in the latter case with the reservation that the surveyor now in office completes certain works already in his hands.

LEGAL.

AN ARCHITECT AND THE BUILDING OWNER:

A QUESTION OF AGENCY.

The case of *Allatt v. Gomersall* came on the 1st inst. before the Court of Appeal, composed of the Master of the Rolls and Lords Justices Lopes and Rigby, it being the appeal of the defendants from the judgment of Mr. Justice Charles, dated December 24, 1894, at a trial without a jury at Leeds. Mr. Wallace, Q.C., who appeared for the appellants (the defendants), said that the action was one brought by a builder against the owners of a property on which cottages were being built, and the subject matter of the action was certain specifications omitted from the quantities for work to be done under a contract.

It appeared that the defendant's architect, a Mr. Ellis, inserted an advertisement in certain papers asking for tenders for the different parts of the work, which was in connexion with the building of fourteen cottages in Churchfield-lane, Castleford, near Leeds, and the plaintiff sent in a tender to Mr. Ellis, in which he undertook to do the excavations, the masonry and brickwork for Messrs. Gomersall, according to the quantities, for 1,540*l.* The tender was submitted to the defendants and accepted, and a contract was entered into. In the course of the work it was discovered that certain things which should have been mentioned in the quantities had been omitted. However, the work was completed, and the plaintiff claimed for the extra work 170*l.*, but the defendants refused to pay on the ground that the plaintiff had contracted to do the work for the lump sum of 1,540*l.*, and that they were not responsible for any mistake in the quantities submitted by the architect.

The Master of the Rolls said that if a man sat down at a table and wrote out the specifications and quantities himself for his own houses, and sent them to a builder for him to tender for the work, and the builder so tendered, surely he would be responsible for any omission. Further, if a man instead of getting out specifications and quantities himself told his architect to do it, the architect would be his agent, and he would be responsible for the architect's omission. Besides, it appeared from the evidence that several persons swore that it was the custom of the architect to act as the agent of the building owner.

Mr. Wallace replied that it was contended for the defendants that the architect was not their agent, and that if he were the agent for anybody it was for the builder; that it was no part of his work as architect to the owner of the property to make out the specifications on which tenders were to be solicited. He said that the position was this. The defendants said to the architect, "We want these houses put up for so much."

The Master of the Rolls said that the learned counsel must not say that, because it was not so. If the houses were to be put up for a certain definite sum, the advertisements asking for tenders would have been differently worded.

Mr. Wallace replied that the object of getting tenders was to get a thing done as cheaply as possible; if possible at a less price than that contemplated.

The Master of the Rolls called attention to the fact that there was evidence that when the omissions were discovered the matter was brought before the notice of the defendants, and that the defendants thereafter allowed the work to go on.

Mr. Wallace replied that if their Lordships found that as a fact it would be fatal to his case.

Their Lordships dismissed the appeal with costs, the Master of the Rolls in his judgment stating that there was no necessity for them to go into the legal aspects of the case, as when the omissions were

discovered, the defendants got the builders to go on, and that amounted to a new promise on the defendants' part.

APPEAL BY THE LONDON BUILDING TRADES FEDERATION:

IMPORTANT DECISION.

ON Tuesday and Wednesday last in the Court of Appeal, the case of *Trollope & Sons v. the London Building Trades Federation* was argued before Lord Halsbury, Lord Justice Lindley and Lord Justice A. L. Smith. It was the appeal of the defendants J. Verdon, secretary of the Federation, and others, from an order of Mr. Justice Kekewich, made in February last, by which he restrained the defendants from the further issue of a yellow poster called "Trollope's Black List," and which it was said by the plaintiffs was prejudicial to their interests as builders and contractors. Mr. W. S. Robson, Q.C., and Mr. Jenkins appeared for the appellants; and Mr. Renshaw, Q.C., and Mr. Butcher, M.P., for the respondents, the plaintiffs.

The circumstances of the case, as stated by Counsel, were that in October Messrs. Trollope were carrying on certain building operations in Park-lane and Grosvenor-square, W., when a dispute arose among the workmen as to the employment of two foremen named Eves and Iliffe. They demanded their dismissal on the ground that they had previously worked against the interests of the Federation. The defendants said that if the plaintiffs refused to comply they would call the men out. The plaintiffs did so refuse, and in keeping with the defendants' threat, about 175 workmen left the plaintiffs' works, though about 500 men remained. This was on November 1st. The works were afterwards picketed, and though no disturbance happened, the protection of the police had to be sought to prevent possible mischief. It was then that the "Black List" complained of was published. It contained the names of the men, most of them non-unionists, who remained at their posts, and it was said to be intended as a warning against their future employment at all works where union laws were in vogue, and against loyal unionists working side by side with them.

Lord Halsbury asked if the "Black List" was so described?

Mr. Robson: Yes, my Lord. It is said of these men who were working "black" that they were men who had refused to comply with the regulations of their trade.

Lord Halsbury said he supposed they were what were called "blacklegs," though the Court of Exchequer did not know what a "blackleg" was. It had no literal meaning.

Mr. Robson: No, my Lord. It carries with it the meaning that he is working against his union.

It was pointed out that in 1892 it was agreed between the masters and men in the building trade that the masters should not treat it as a disqualification to men seeking employment that they were trades' unionists; and, on the other hand, that trades' unionists should consent to work with non-unionists.

Mr. Robson further argued that the defendants had done no more than exercise their legitimate right to maintain a fair standard of wages and the regulations of the building trade. This being their ultimate object they were entitled to do it, even though it injured those against whom their efforts were directed, if there were an absence of malice.

Lord Halsbury observed that Mr. Robson's argument appeared to support what was known in modern language as boycotting.

Mr. Jenkins followed on the same side. Mr. Renshaw, Q.C., for the plaintiffs, said the poster proved a wrong done, and in an interlocutory matter of this sort he had only to make out a *prima facie* case to get the Court's confirmation of the decision of the learned Judge in the Court below. The issue of the poster was tantamount to an interference with the lawful calling of the plaintiffs.

Mr. Butcher having also argued in support of the respondents' case,

Lord Halsbury, in giving judgment, said they encountered considerable difficulty in expressing an opinion on the material issues to be tried. There were grave questions of law and fact involved, and they found that in the dissemination of these placards the defendants had shown an excess in their method of publication. There was a *prima facie* case made out, and as the defendants had declined to give an undertaking to cease the continuance of this publication till the trial, they saw no reason to interfere with Mr. Justice Kekewich's order. The appeal would accordingly be dismissed with costs.

Lord Justice Lindley: I have nothing to add except to say that this is an attempt to force our hands, and we will not be forced.

Lord Justice Smith concurred.

MEETINGS.

FRIDAY, MARCH 8.

Institution of Civil Engineers (Students' Meeting).—Mr. A. Struben on "The Co-ordinate System of Surveying as Employed in South Africa," 8 p.m.
Royal Institution.—Professor A. W. Ricker, M.A., F.R.S., on "The Physical Work of von Helmholtz," 9 p.m.
Sanitary Institute (Lectures and Demonstrations for

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered.
*Infectious Diseases Hospital.....	Penzance Town Coun.	317 10s. 21s. and 15s. 10s.	Mar. 19
*Orphan Homes and Schools.....	Chertsey Union.....	75s. 50s. and 52s.	April 30
*Shops, Offices, Two Hotels, &c. Preston.....	N. Hillier.....	150s. 120s. and 50s.	May 27

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
*Sewage Works.....	Essex Corporation.....	G. Wilson.....	Mar. 9
*Works and Materials.....	Lewisham, Bd. of W. Llandudf Bldg. Board.....	John Holden.....	Mar. 12
Cookery Centre, Greenwich School.....	Hartley (J. D. & Son, R. Capt. J. Smith.....	Hemston & Houston.....	do.
Fl. King Bldg. Cuthbert House.....	York Corporation.....	J. J. Milligan.....	do.
Additions, &c. to Schools, Aberystwyth and Cymmer, North.....	Glyncegrove Sch. Bd. Edinborough U.D.C.....	A. Crest.....	do.
*Works and Materials.....	Edinborough U.D.C.....	G. B. B. Scott.....	do.
*Making up Roads.....	Fulham Vestry.....	C. Botterill.....	Mar. 13
Improvement Works, Greenwich road.....	Halifax Corp.....	J. W. Sturt.....	do.
Nine Houses, Outlandings, Walls, &c. Lower Wortley road, Leeds.....	Halifax Corp.....	H. B. Buckley.....	do.
*Works and Materials.....	Halifax Corp.....	Robt. Walker.....	do.
House, Grove Park road, Weston-super-Mare.....	Halifax Corp.....	H. B. Buckley.....	do.
Sewer at Water Main, Parnham West.....	Cork Union.....	Priv. & Wooler.....	do.
*Office, Bedford, Clonmel, &c. Water Main, Parnham West.....	Aberdare U.D.C.....	Official.....	do.
Granite Road Metal.....	M. R. Co. Desborough U.D.C.....	W. T. Stratford.....	do.
Broken granite 12,000 sq. ft. Water Main, Parnham West.....	Isle of Wight U.D.C.....	G. J. Moore.....	do.
Allegation, &c. to Chapel, Banford, near Hoxdale.....	Rev. J. Hall.....	S. Spencer.....	do.
Additions to National School, Clayton, Berks.....	Essex of H. Milne.....	Robt. Walker & Duncan.....	do.
*Works and Materials.....	Colliestown (N.B.) Har- lott Trustees.....	A. McNeill.....	do.
Forming Streets and Passages.....	Warrington Corp.....	Thos. Longtin.....	Mar. 17
Twelve Houses and Store, Albert-road, Berch, York.....	Sewarby Bridge Indus. Labral Clth.....	M. Hall.....	Mar. 18
Club Premises, Waterford, Lanes.....	Upper Short Valley Main Sewerage Board.....	E. B. Marten & W. Fiddian.....	do.
Main Outfall Sewer, Whittington.....	Preston Corporation.....	Official.....	do.
Public Abattoir Brookstreet North.....	Corporation of London St. Giles Rd. of Works.....	G. Wallace.....	do.
Supply of Coal.....	Clitheroe R.D.C.....	Jas. Diggle.....	do.
*Works and Materials.....	Llandudno U.D.C.....	K. F. Robinson.....	Mar. 19
Construction of Sewers.....	G. W. R. Co. Southall - Norwood.....	Official.....	do.
Asphalt Paving.....	St. Helen's (Lanes) Corp.....	St. Helen's (Lanes) Corp.....	Mar. 20
Sewage Purification Works, Whalley.....	St. Helen's (Lanes) Corp.....	G. J. C. Broom.....	do.
Stoneware Pipes, Mauldine, &c. Railway Station, Rhymney Junction, Glam.....	St. Helen's (Lanes) Corp.....	E. Cousins.....	do.
*Two Betting Tack and Filters, &c. Betts, Channels, Flaga, &c. Sewerage Works (5,270 yards).....	St. Helen's (Lanes) Corp.....	E. Cousins.....	do.

CONTRACTS—Continued.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Store Buildings, Biddal.....	Halifax Indus. Soc.....	Horsfall & Williams.....	Mar.
Pipe Works and Showrooms, Pelson lane, Halifax.....	C. F. L. Horsfall & Son.....	G. R. W. Wheeler.....	do.
*Paving Works.....	Westminster Vestry.....	G. M. B. & N. Vaughan.....	do.
*House with Coachhouse, &c. near Wey in fire.....	Town U.D.C.....	M. W. Davies.....	Mar. 21
Sewerage Works, Aberystwyth.....	Gant & R.D.C.....	J. F. W. Jones.....	do.
Pipe Works, 1,000 yards, &c. Slips and Presses, Hag. East-street, Lanes.....	Walton U.D.C.....	G. W. Holmes.....	do.
*Road Works and Erection of Iron Fencing Surveys Materials, Bamber Bridge, Bolton.....	Walton U.D.C.....	Walton U.D.C.....	do.
Barry-lane, Longridge, Preston, Lanes.....	Managers of Cave Memorial School.....	J. A. Seward.....	do.
*New Buildings.....	Managers of Cave Memorial School.....	J. A. Seward.....	do.
Outfall, Slinger Works, B. & Bridge, Steel Girder Bridge over River Calder, Yorks.....	Managers of Cave Memorial School.....	J. A. Seward.....	do.
*Erection of Siding Office at Wood Green Roadway and Approaches to Bridge, Yorks.....	Managers of Cave Memorial School.....	J. A. Seward.....	do.
*Bridge from, near B. & Bridge, Yorks.....	Managers of Cave Memorial School.....	J. A. Seward.....	do.
*Timber-Framed, Piling Battery, &c. London, Farnham, &c. Yorks.....	Managers of Cave Memorial School.....	J. A. Seward.....	do.
*Sewerage Works.....	Managers of Cave Memorial School.....	J. A. Seward.....	do.
*Erection of Schools.....	Managers of Cave Memorial School.....	J. A. Seward.....	do.
*Laying out Land for Drainage, Farnham, Yorks.....	Managers of Cave Memorial School.....	J. A. Seward.....	do.
Stores, Bakery, House, &c. Wallingborough-road, B. & Bridge, Yorks.....	Managers of Cave Memorial School.....	J. A. Seward.....	do.
*Extension of Engineers Works, Leeds.....	Managers of Cave Memorial School.....	J. A. Seward.....	do.
*Preston, B. & Bridge, Manchester.....	Managers of Cave Memorial School.....	J. A. Seward.....	do.
Part Semi-detached Villas, Otley, Yorks.....	Managers of Cave Memorial School.....	J. A. Seward.....	do.
Spargue, G. Cadell.....	Managers of Cave Memorial School.....	J. A. Seward.....	do.
Primitive Methodist Chapel and Schools, Ruskell, Farnham, &c. Yorks.....	Managers of Cave Memorial School.....	J. A. Seward.....	do.
*Various Works at Workhouse.....	Managers of Cave Memorial School.....	J. A. Seward.....	do.
*Building Materials and Tools.....	Managers of Cave Memorial School.....	J. A. Seward.....	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Appointments to be made.
*Surveyor.....	Bedford R.D.C.....	150s.....	Mar. 1
*Surveyor.....	Bedford R.D.C.....	150s.....	Mar. 1
*Surveyor.....	Bedford R.D.C.....	150s.....	Mar. 1
*Surveyor.....	Bedford R.D.C.....	150s.....	Mar. 1
*Surveyor.....	Bedford R.D.C.....	150s.....	Mar. 1
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*Surveyor.....	Bedford R.D.C.....	150s.....	Mar. 1
*Surveyor.....	Bedford R.D.C.....	150s.....	Mar. 1
*Surveyor.....	Bedford R.D.C.....	150s.....	Mar. 1

Those marked with an asterisk (*) are advertised in this Number. Competitions, pp. iv, vi, viii, and xxi. Public Appointments, p. xix.

Sanitary Officers.—Dr. J. F. J. Sykes on "Objects and Methods of Inspection." 8 p.m.

Architectural Association.—Visit to the Brompton Oratory. 3 p.m.

Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—Inspection and Demonstration of Friem Barnet Sewage Works.

Queen's College, Cork.—Mr. Arthur Hill on "The History of Architecture." XIV. 3 p.m.

Royal Institute of British Architects.—(1) Special General Meeting to elect the Royal Gold Medalist for the current year; The Chairman to move—"That, subject to Her Majesty's gracious sanction, the Royal Gold Medal for the promotion of Architecture be presented this year to Mr. James Brooks, Vice-President for his executed works as an Architect." (2) The Tenth General Meeting (Business) of the Session will be held at the conclusion of the above-mentioned Special General Meeting. 8 p.m.

Clerks of Works' Association (Carpenters' Hall).—Paper by Professor Banister Fletcher. 7.30 p.m.

Liverpool Architectural Association.—Mr. Percy S. Worthington (Manchester) on "Churches of the Twelfth and Thirteenth Centuries in Burgundy." 6.30 p.m.

Tuesday, March 12.

Institution of Civil Engineers.—(1) Mr. William Duff Bruce on "The Kidderpore Docks, Calcutta." (2) Mr. James Henry Appleton, on "The Movement of the Walls of the Kidderpore Docks." 8 p.m.

Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—Dr. Arthur Newsholme on "Nature of Nuisances, including Nuisances the Abatement of which is difficult." 8 p.m.

Glasgow Architectural Association.—Visit to Titwood Established Church. Mr. H. E. Clifford, architect. 5.30 p.m.

Wednesday, March 13.

Architects' Benevolent Society (9, Conduit-street, W.).—Annual General Meeting of Subscribers and Donors. 5 p.m.

Carpenters' Company (Free Lectures on Matters Connected with Building).—Professor Banister Fletcher on "Comparisons and Contrasts in Architecture." 8 p.m.

St. Paul's Ecclesiastical Society.—The Rev. Canon Browne, F.S.A., on "Some Inscriptions of the British Church." 7.30 p.m.

Sanitary Institute.—A Discussion to be opened on "Back-to-Back Houses," by Dr. James Nyren, with illustrations of various types of Back-to-Back Houses met with in practice, and the methods adopted for dealing with this class of property, by Mr. Thomas De Courcy Meade. 8 p.m.

Sanitary Institute (Lectures and Demonstrations for

Sanitary Officers).—Inspection and demonstration of the disinfecting station, &c., at St. Pancras. 3 p.m.

Northern Architectural Association.—Paper by Mr. J. M. Moncrieff. 7.30 p.m.

Thursday, March 14.

Society of Arts.—Professor Hubert Herkomer, R.A., on "Art Tuition." 4.30 p.m.

Society for the Encouragement of the Fine Arts.—First conversations at the Gallery of the Royal Institute of Painters in Water Colours, Piccadilly.

Society of Antiquaries.—8.30 p.m.

Civil and Mechanical Engineers' Society.—Mr. S. A. Court on "Lifts: Hydraulic and Electric." 7 p.m.

Institution of Electrical Engineers.—Mr. N. S. Keith on "The Electrolysis of Gold." 8 p.m.

Friday, March 15.

Architectural Association.—Mr. J. W. Singer on "Iron and Brass." 7.30 p.m.

Royal Institution.—Professor Roberts-Austen on "The Rarer Metals and their Alloys." 7 p.m.

Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—Professor A. E. Cockhill on "Trade Nuisances." 8 p.m.

Saturday, March 16.

Architectural Association.—Visit to the Chelsea Town Hall, Polytechnic, and Free Library (see advt. on front page).

St. Paul's Ecclesiastical Society.—Visit to Sir John Soane's Museum, No 13, Lincoln's Inn Fields, under the guidance of Mr. George H. Birch, F.S.A., at 3.30 p.m.

Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—Inspection at the Aylesbury Dairy Company's Premises.

Edinburgh Architectural Association.—Visit to Liberton House.

Queen's College, Cork.—Mr. Arthur Hill on the "History of Architecture." XV. 3 p.m.

Junior Engineering Society.—Visit to the Midland Railway's Goods Station and Depot and Repairing Shops, St. Pancras. 3 p.m.

Sunday, March 17.

South Place Institute.—Miss Frances Hicks on "Factory and Workshop Inspection." 4 p.m.

PATENT PATENTS:

ABSTRACTS OF SPECIFICATIONS.

2,272.—**WINDOW-FASTENER.** *P. Genton.*—This invention consists of a sliding bolt carried upon a screw and for entering a casing fixed upon the other said bolt and locking the two together. A catch controlled by a spring on being liberated turns upon its centre and further secures the two shafts.

2,271.—**WINDOW-CATCH.** *W. Blair.*—According to this invention a cone-shaped striking piece is fitted to the

upper sash, which, on closing window, is pressed into locking piece on the lower sash, making a kind of dovetail connection. A bolt with a wedge-shaped nose is forced in a recess in the striking piece by a spring and completes the arrangement.

1,632.—**ASBESTOS CEMENT.** *A. Kuhlmann.*

material for protecting wood and iron structures against the weather, rendering them fireproof. Asbestos is mixed with substances such as gypsum, lime, powdered chalk, ordered freely, graphite, &c., in various proportions.

3,368.—**SEWER-PIPES.** *W. Morris.*—For easy inspection of the street upright ventilating pipes, and to keep out the roadway dirt, a cast-iron box, with a hinged lid, is inserted in the pipe from the top of the manhole. The lid is at the side in the interior of the box, and the lid is provided with corresponding openings.

6,085.—**WATER-CLOSERS.** *T. Manks.*—Relates to close in which the basin is discharged by siphonage through trap-bend. The basin and trap-bend is constructed in one or more pieces, with the discharge passage extending down wards from the bottom of the basin in a vertical direction and communicating at its base with the ascending leg of the siphon-trap-bend. The ascending leg is thus rendered longer, and a second trap-bend is rendered unnecessary.

14,255.—**DOOR CATCH.** *W. G. F. Muller.*—Relates to a device for preventing draught, dust, &c., from entering under doors, &c., a metal bar is hinged to the floor across the doorway, which rises or falls as the door is opened or shut. On closing the door a hook, catching the bar, raises it to its edge.

20,797.—**W. G. F. MULLER.** Relates to a closet basin constructed with a baffle or shell made separately from the basin, and secured over the delivery passage in such a way as to form lateral exits or discharging openings.

20,855.—**LAVATORY BASINS.** *M. Adams.*—Relates to a device for carrying away the water after the basin is formed in the body of the material beneath the bottom of the basin; over it is seated the waste-pipe. A trap is fixed beneath the basin, and helps to support it.

NEW APPLICATIONS FOR LETTERS PATENT.

FEBRUARY 18.—3,434. A. Collis, Preventing Bursting of Kitchen and like Boilers.—3,450. W. Pullen, Soldering Irons.—3,451. J. Jones, Waste Flaps for Lavatories, &c.—3,452. H. Silvester, Stair Treads, Floors, and similar surfaces.

FEBRUARY 19.—3,520. A. Wilesmith, Stoneware Drain Pipes or other analogous apparatus.—3,551. J. Klein, Flange and Drain-proof Ceilings and Walls.—3,504. J. Worthington, Bricks and Tiles.—3,506. J. Brown, Imitation Italian Glass.—3,611. C. Bastand, Wedge-grip for Preventing Doors being Opened on the Outside.—3,669. J. Willis, Windows.—3,689. D. O'Neil and others, Caulking the Joints of Pipes and Drains.

FEBRUARY 21.—3,773. W. Mann and J. Polla, Machinery for Pressing Bricks, Tiles, &c.—3,748. J. Ingham and others, Wood-working Machinery.—3,746.

The Builder.

VOL. LXXVIII. No. 2775

MARCH 16, 1895.

ILLUSTRATIONS.

Design Submitted in Competition for the Darlington Municipal Buildings. By Mr. R. A. Briggs, F.R.I.B.A. Double-Page Photo-Litho.
Design for New Public Offices and Technical Institute, Leyton. By Mr. F. H. Tulloch, A.R.I.B.A. Double-Page Ink-Photo.
Accepted Design for New Vestry Hall, Rotherhithe.—Messrs. Murray & Foster, Architects Double-Page Ink-Photo.
Sketches of Ironwork at Florence and Siena, and Mosaic Pavement at St. Mark's, Venice.—By Mr. A. C. Blomfield Double-Page Ink-Photo.

Blocks in Text.

Illustrations of Ancient Buildings in Cambodia Pages 195, 197
Plan of Design for Technical Institute, Leyton Page 215
Plan of Design for Darlington Municipal Buildings Page 204

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West Australian Notes.



WESTERN Australia, the Cinderella of the Australian colonies, seems at last to have been found out by her fairy godmother, and from a hand-to-mouth existence has suddenly been elevated to the dignity of, apparently, the most prosperous colony of the group, with a rapidly increasing revenue and the ability to spend it, besides such further advances as a confiding uncle, in the shape of John Bull, is willing to make on loan.

The enormous territory, nearly a third of the continent, and the paucity of population are by-words; but the magic influence of gold discoveries in the interior is the cause of the sudden change that has taken place—and the gold is there, not in one or two patches, but spread over a very extensive section of the country.

To an architect it is very interesting to see a new centre of population spring up in the desert almost as it were by magic; and though there is nothing to interest the lover of the beautiful in Coolgardie or Cue as they now are, the possibilities of the future are an un-failing source of speculation and prophecy to the sanguine inhabitants. So far, calico tents, hessian huts, and galvanised iron banks, stores, and hotels predominate; but, nevertheless, there were to be counted the signboards of seven architects, though what they find to do in the way of architecture is a mystery. Some take the sub-title of "mining surveyor," and probably in this line find more profit than in regular work. There is, it may be observed, one stone building, or rather front of a building, though what it must have cost for water it would be interesting to know, especially as that liquid, if condensed, sold at 6d. a gallon till the rain came.

However, Coolgardie is the most progressive place of a now progressive colony, and a large stone building for offices and exchange is to be put in hand at once, and other solid structures are to follow, so that a year hence it is probable one would scarcely recognise it as the same place; that is, if

the promises of gold given by the prospectors claims are verified on deeper sinking, and if a permanent supply of water is obtained: two large "ifs," the solution of which will make or mar this outpost of civilisation.

The same may be said of Cue, on the Murchison, except that for water one must read timber, as the former is comparatively plentiful, and in the main street adjoining the public well one may indulge in the unheard-of luxury of a shower-bath for the modest sum of one shilling. The water is hauled up by two men, and a bucket discharged over your head while you wait, and then you walk back in your pyjamas across the dusty street to your tent or hotel, as the case may be. With a shade temperature of 110 deg. and perpetual dust, life would not be worth living without that bath. But there was not even that minimum of comfort at Coolgardie.

There are no stone buildings in Cue except the Wesleyan Church. All the rest are of "bats," iron, or hessian. "Bats" are simply sun-dried bricks, and put together with mud and the merest sprinkling of lime, make a good wall so long as the water does not get to it from above or below; but in this town, a year or so old, many of the bat walls are already crumbling. Four miles away is the rival township of Day Dawn, and here is quite a pretentious one-story rubble-stone faced hotel, with burnt brick dressings. Its style, so we were informed with much pride, is "Broken Hill," and thus the great silver-mining town of New South Wales has added a new order to architecture. The walls inside are plastered with mud innocent of lime, but ceilings are non-existent, and from the bedrooms one looks straight at the iron roofing and enjoys the conversation of one's neighbours. With freight at 24s. per ton from Mullewa, the nearest railway station (240 miles away), wooden ceilings are too great a luxury even for a hotel-keeper, and so he will wait till the railway is made. The attenuation of the rafters is marvellous; they are 3 x 1, and spaced about 5 ft. apart. The jerry-builder is outdone.

In Perth, the capital city of this vast colony, one finds a marked contrast to the temporary expedients of the feverish life of the goldfields. Situated on the gently-rising shore of the Swan River, which here spreads

out into quite a lake, it has, or had till quite recently, all the old-world quietude of an English country town, and the many solid but unpretentious houses of fifty years ago, with their fine gardens down to the water's edge, help the illusion.

Signs of progress are, however, not wanting; and, twenty years ago, a picturesque town hall in Domestic Gothic was erected from designs by an English architect, which, in general composition, is quite equal to simple works of the kind in the old country, though cement replaces stone in the dressings, and the detail leaves a little to be desired. Of more recent date is an Anglican Cathedral of brick and stone, Early English in design, of which the Perth people are not a little proud, though in dimensions it is not greater than an ordinary parish church; still, it cost 17,000*l.*, a large sum for a small community. In plan it is of the usual type—nave, aisles, and transept, with a lead-covered flèche over the crossing.

Close by are the Government offices, consisting of the Post and Telegraph Department, with its large central hall, having the Treasury on one side and the Works Department on the other. The latter is the newest addition (in brick with cement dressings), and is really good Renaissance work with a somewhat American flavour. The arcade and projecting balcony of the first floor are the most noticeable and satisfactory features. To Mr. Poole, the present Government architect, is due the credit of this advance in official design. His Government printing-office, with its rather heavy angle turrets, is not so satisfactory, but the subject requires rather more prosaic treatment, and, moreover, it is the first instalment of a larger building. With the increased prosperity of the Colony, other Government works are sure to follow, and sites are already being discussed and decided for Parliament Houses, a Supreme Court, and the University. Of commercial buildings the banks are the most important, and the offices of the West Australian, the Union, and the National are the best. They are all placed on St. George's-terrace, the only street of considerable width in the city, and are Italian in design and cement in treatment.

Stone of good quality is not found in the near neighbourhood, and even if it were, the expense of working it is prohibitory in a young country where all labour is expensive.

There is one very pretentious hotel with huge attached cement columns on its front, a specimen of how not to do it (in design), and that is about all worth mentioning in business premises. A few small villas, fairly suited to the climate, are being erected, but they are much too ornate in detail, and have "Melbourne" writ large on their elevations. Till recently there were only four architects in Perth, and they found it hard work to make ends meet, but now their name is legion, and a newcomer's brass plate regularly makes its appearance at about the rate of one a week. So there is no hope here for the unemployed of the profession in England; there are too many architects already in Australia; and Adelaide and Melbourne, especially the latter, could supply architectural talent to a dozen Perths, for it must be remembered it is still only a small town of about 14,000 people; and the other towns of the colony are little better than good-sized villages.

To what the colony may grow is an open question; the gold-fields have given it a start, but only an increased population of agriculturists and pastoralists can ensure permanent prosperity.

FURTHER NOTES ON ANCIENT CAMBODIAN ARCHITECTURE.

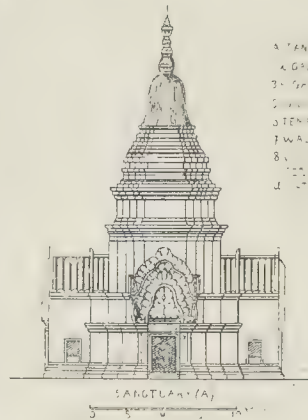
THE principal parts of the temple of Angkor Wat (see page 118 *ante*), are supposed to have been completed at the end of the first century A.D., but the works were proceeding long after this time, and when the sacred books of the Buddhism arrived from Ceylon, in 638 A.D., they were not yet at an end.

A stone road going from the city toward the south is now mostly covered by earth. Following this road one sees on the right hand the ruins of the sanctuary of Bakheng on the top of a hill. At a distance of two miles we reach Angkor Wat. Then, in contrast with the solemnity of this magnificent temple, the town of Siemrap offers to the view its walls, erected a little more than a century ago with stones taken from the ruin. It is a large village of 1,000 inhabitants. Proceeding toward the south we come on two ruins presenting some interest; that of the temple of Atwea, and then the sanctuaries of Pnom Krom. Many of the monuments are completely ruined. Ban Yang, Pinean Acas, and the city gate, illustrations of which are appended to this article, are still sufficiently well preserved to give a good idea of their structure; but judging by their condition they will probably before long be only ruins. Angkor Wat is the best preserved. Nearly all are surrounded by thick jungles abounding with tigers and other wild animals.

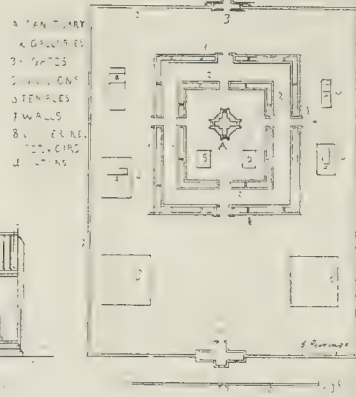
Angkor Wat, the ancient Royal temple of the Khmers, stands in the centre of a park enclosed by a rectangular wall which has a total length of nearly four miles. Outside the walls is a canal, crossed by sumptuous bridges on the east and west, and plainer ones on the north and south. The principal entrances, as before observed, are in the western wall. They are two in number, placed at each end of a monumental façade formed by three porticos surmounted by towers, with a gallery on either hand. One temple is divided into three stories, each surrounded by a gallery; in the centre of the highest is the sanctuary, crowned by a tower.

Sculptures of gods, heroes, demons, &c., cover every part of the first gallery. In the centre are spacious courts, in like manner profusely decorated with sculpture. Fourteen stair flights give access to the terrace of the second gallery. Above this rises a block of building on which is the third gallery. Within this gallery are other sculptured courts, and in the centre the great central sanctuary, over which is a large and lofty tower, covered with sculpture. A statue of Buddha is placed on an altar inside the

Sanctuary, Temple of Preacong.



Temple of Pnom Bachei.



sanctuary. The statue was presented by the late King of Siam about forty years ago. A few poor priests, in charge of the idol, live in the neighbouring jungle.

The second gallery is divided into thirty-six rooms, all decorated with bas-reliefs of heroes and battle-scenes.

The temple of Angkor Wat has never been completely deserted, to which fact is to be ascribed its relatively good state of preservation. It has always been held in high veneration, and is still the object of pilgrimages. Its first erection is traditionally attributed to the second century A.D., though the work of ornamentation or carving within its precincts is said to have been continued for some centuries after that epoch.

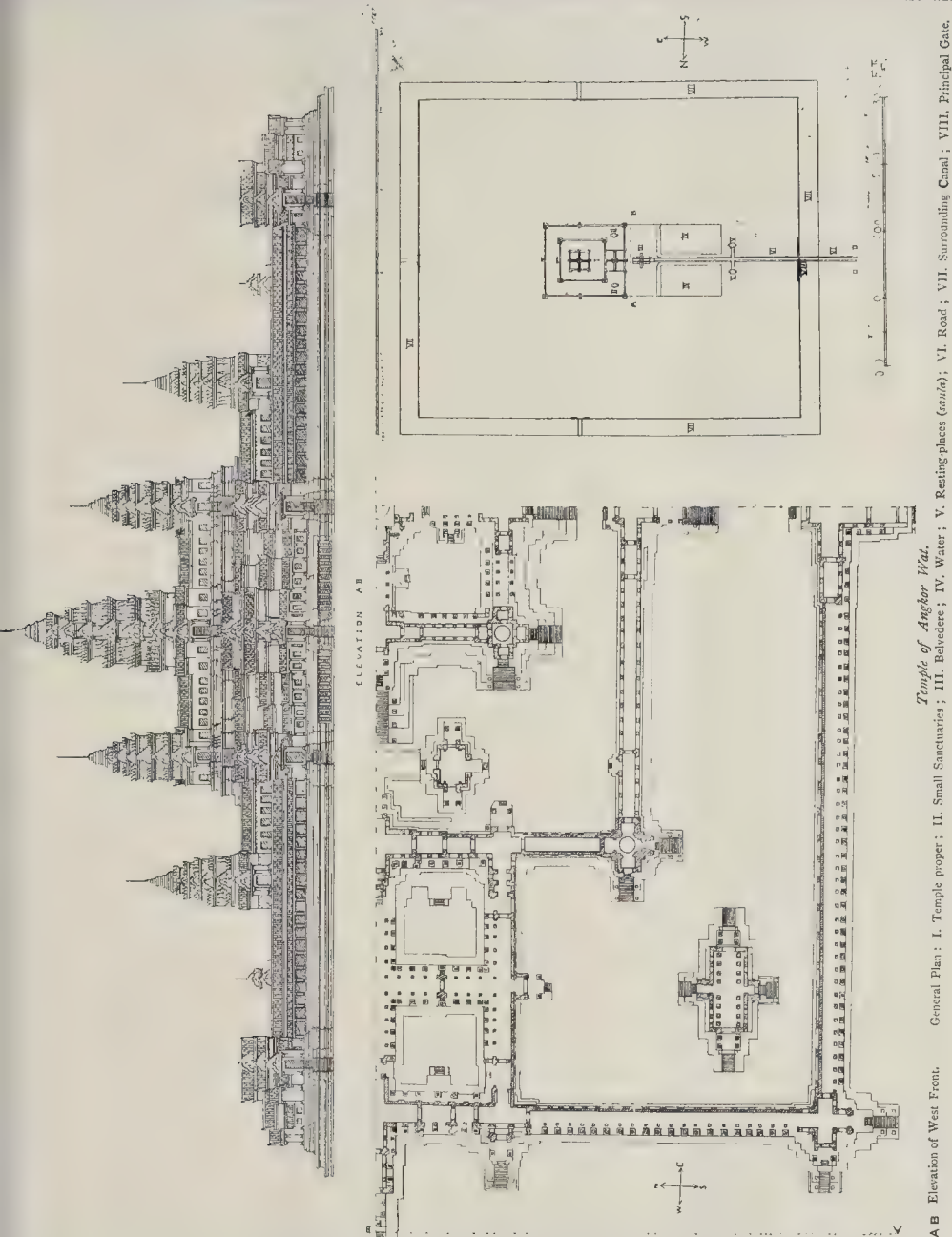
The temple of Preacong, some miles on the south-east of Angkor Wat, offers to the view amongst its ruins, a Phrasat, or sanctuary, probably contemporaneous with the best monuments of the Khmers. We give a restored sketch of it.

The temple of Pnom Bachei is placed at a short distance from Pnom Penh, the modern capital of Cambodia, about one hundred miles on the south of the group of ruins of Angkor.

The sketch of this gives an idea of the appearance of the later monuments of the Khmers, when their empire was on its decline. According to a sanscrit inscription found in the ruins, this temple was erected in the eleventh century, A.D.

NOTES.

THE interim report of the Committee of the House of Commons on Distress from Want of Employment, more shortly called the Unemployed Committee, illustrates the prevailing weakness of Parliament to try and please sections of the country by appointing Committees which, specious in appearance, can do no real good. The fourth clause of the reference was that the Committee should make an interim report at the earliest possible date "on what steps should be taken either by Parliament, the Departments of the State, or local authorities to meet the distress this winter." Every sensible man knew perfectly well that even any practical scheme could be formulated which was doubtful, there would not be time to work it out before the pinch of the winter had departed. But the Committee cannot recommend any scheme (a) which would be immediately available during the remaining weeks of the winter season, or (b) which Parliament would take into consideration without further inquiry. This is what, as we have said, was to be expected; the appointment of the Committee was a mere political sop. On thing, however, is satisfactory, the report shows that there has been "no lack of employment beyond that which might be expected as a consequence of an unusually severe winter." Of course, the consequence of an unusually severe winter necessaries



Temple of Angkor Wat.

General Plan : I. Temple proper ; II. Small Sanctuaries ; III. Belvedere ; IV. Water ; V. Resting places (causa) ; VI. Road ; VII. Surrounding Canal ; VIII. Principal Gate.

AB Elevation of West Front.

a large amount of temporary distress, and this the Committee tell us has existed during the frost. But we do not want a committee of the House of Commons to give us information which every observant person can ascertain for himself. The committee, however, are going to continue their investigations into the question of want of employment. But no interest can possibly attach to their work, for we have already had the question considered both by the Royal Commission on Labour and by that into the State of Agriculture. Some more facts may, no doubt, be collected and indexed in a Blue-book. But employment and want of it are governed by great

causes acting throughout the world, and no Committee of the House of Commons will affect these.

WE recently commented on the excellent and liberal conditions issued by the authorities of West Ham in their instructions to architects for the competition for a new Technical Institute. It is unfortunate that the West Ham County Council, after making such an excellent start, should have put themselves in the wrong in the most extraordinary manner by issuing, six weeks after the competition was advertised, supplementary instructions to competitors (apparently, partly in answer to enquiries),

which for those who have got their plans in a forward state must mean beginning over again. One of these new instructions is that a space of 25 ft. must be left between the buildings and the line of road on the flank of the site. There was nothing to indicate this in the original instructions, which we have looked over carefully. Another addition is that a refreshment-room and bar are to be provided, and another that the space required for boiler and engine-room and electric light machinery has been doubled. But the important point is the cutting off of twenty-five feet on the flank of the building. We have seen one design in which the plans and elevation are

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in ink, and according to these new instructions would all have to be commenced over again. Did the assessor agree to springing this surprise on the competitors? The only supposition we can make is that, as the time was by the same supplementary instructions extended from May 1 to June 1, the Council and their assessor (perhaps from some knowledge of the ways of competing architects) assumed that in all probability the competitors would not have got very far with their designs yet. It is not safe, however, to make such assumptions, and competition committees should settle details more carefully at the outset. If there are many competitors who have got their plans in a forward state their time will have been wasted, and it seems a question whether they will not have a legal claim against the West Ham authorities for compensation.

THAT all the great waterfalls of the world will be utilised for the development of power seems to be coming about rapidly. The beautiful Snoqualmie Falls, in the State of Washington, U.S.A., have been sold, and a large power-station, which is being erected there, is expected to begin working this year. The scenery of the State of Washington, which State must not be confounded with any of the over 200 towns in America of that name, rivals Switzerland in beauty. The Snoqualmie Falls are 268 ft. in height, or 100 ft. higher than Niagara. They are only twenty-three miles west of Seattle, a seaport town which, fifteen years ago, contained only some three thousand inhabitants, but now has a population of over fifty thousand. The company will have ultimately a capital of 400,000l., and at present is laying down plant to develop and deliver 5,000 horsepower to Seattle. They intend to charge 6d. per horse-power per annum there, or about half what the same power developed by steam would cost. They have recently got a demand for power and light from an unexpected source. Along the line of transmission are many coal-mines. These mines use for pumping, hoisting, and lighting over 1,000 horse-power, which they generate by the use of their own coal. It is found that it pays the coal-mines to use the electric power, as the cost is no greater than what they pay already, and it reduces the danger from fires, &c., to a minimum. With Niagara in the east and Snoqualmie in the west, proposing to transmit about 10,000 horse-power a distance of twenty-six and twenty-three miles respectively, it will be seen that in America the commercial value of large waterfalls is well recognised. Whether the world will gain as much as it will lose by the substitution of the mechanical for the picturesque value in great waterfalls is another question.

IN his monthly report to the Kensington Vestry, Dr. Orme Dudfield calls attention to one subject in connexion with the recent severe frost which is of considerable importance in a sanitary sense. He says:—Amongst people who have taken advantage of the prolonged frost to lay in a store of ice, for summer use, not the least diligent have been the peripatetic makers and vendors of the delicacy known as 'ice cream.' My attention was directed by Inspector Pettit to the proceedings of some of these people, of Italian origin, who have collected, from the Grand Junction Canal, large quantities of ice, now stored in certain stables in this parish. I have inspected that portion of the canal, not in Kensington, whence the ice was taken. The water was very dirty, and the ice far from satisfactory in appearance. Multitudes of fish had been frozen into the ice, as well as dead dogs, cats, &c., in a more or less advanced state of decomposition. I was informed, moreover, that the residents in some of the houses abutting on the canal had, during the frost, cast excremental matters upon the ice, and I myself saw considerable quantities of vegetable refuse thereon. No

doubt care is taken by the ice collectors to avoid crude filth of all descriptions, but ice from such a contaminated source would obviously be unfit for human consumption." The question as to where the ice is got from that goes into "ices," cheap ones especially, has been a good deal overlooked, and Dr. Dudfield's hint on the subject ought to receive the attention of medical and sanitary inspectors. An analysis of ices sold might lead to some important and not agreeable disclosures.

THE report to the Local Government Board by Dr. S. Monckton Copeman on the general sanitary condition of the hamlet of Crofton, in the parish of Orpington, in the Bromley Rural Sanitary District, with reference to the occurrence there of outbreaks of diphtheria, draws attention among other points to the effect of the special quality of the land in a district pervaded by cesspools. Contrary to Dr. Copeman's advice, but with the approval of the Authority, an experimental system was tried which is known locally as the "Bexley" system—i.e., the emptying of cesspools by means of pumps and carts, and the deposit of the sludge on the neighbouring agricultural land. Crofton is situated on high land 380 ft. to 400 ft. above the level of the sea. The soil is mainly London clay with large pockets of Woolwich pebbles and porous sea sand. The ground is full of land springs, from which the river Cray takes its source, and the pressure of this land spring-water makes it impossible to construct impervious cesspools. The necessary result is that the surface soil becomes impregnated with sewer overflow, and has a strong tendency to promote the growth of diphtheric germs. The Bexley system has been unable to cope with these difficulties, and, as Dr. Copeman predicted, another serious and fatal outbreak has resulted. In concluding his report, Dr. Copeman says:—

"At present the soil is not only water-laden, but filth-laden as well. This state of affairs would undoubtedly be improved by an efficient drainage system, which would also probably aid in the removal of ground water and afford an opportunity for the gradual cleansing of the soil, with the additional advantage that all excremental matters and liquid refuse would be promptly removed from the neighbourhood of dwellings. The relative cost of any such drainage system is, of course, a matter for the consideration of engineering experts, but in the event of the district growing in the future, each new house, supposing the Bexley system to be retained, would require an expensive cesspool, while the cost of connecting each house-system with an existing sewer would be comparatively trivial. I would therefore recommend that the Bromley Rural Sanitary Authority should undertake as expeditiously as possible the laying down, in connexion with the existing Orpington sewer, of a sewerage system to serve the Crofton district."

AMERICAN street-paving has not generally been in the past looked upon as supplying a standard of excellence for other countries. That has been due to political causes, or municipal rather than engineering causes, and there has been much improvement of late. Mr. S. Whinery has contributed a paper to the "Journal of the Association of Engineering Societies of Philadelphia," in which he discusses the properties desirable in an artificial asphalt pavement, which he describes as an artificial sandstone, composed mainly of quartz sand of a fine sharp character, cemented together with asphalt, mixed with the residuum of petroleum; the mass resting upon a proper foundation. Refined asphalt is melted at a temperature of 300 deg. Fahr., after which about 17 per cent. of residuum oil is added to soften it. The whole is thoroughly mixed by blowing air into it. The sand is screened and also heated to a temperature of about 320 Fahr. by means of revolving drums placed over a furnace. Pulverised limestone is then added to the sand. The sand, limestone, and asphalt are next thoroughly mixed in a pug-mill, and the material is then ready for use. The proportions are 77 per cent. of sand, 10 per cent. of limestone, and 13 per cent. of

asphalte and petroleum residuum. The asphalt is laid on the foundation in two thicknesses, the lower coat being about 5 per cent. richer in asphalt than the surface coat. A steam-roller is used to consolidate the mass.

WE hear much of the technical education of the younger men who will be practising independently some ten years hence. We never hear of anything being done for the older men who may not have had opportunities of keeping in touch with modern improvements. We do not often see older men attending, say, a lecture on stresses or strains at the Architectural Association. Now we hear of special arrangements being made at Berlin for older practitioners who are anxious to improve themselves, and who are not great readers, or find little satisfaction in the specialist papers rapidly read at the meetings of their professional associations. Dr. Weyl, well known as a hygienist in Germany, proposes a course of lectures on sanitation, specially worded for the older brethren, and other lectures of this kind are to follow. Care has been taken to find a hall out of the route of the juniors of the profession, i.e., at one of the medical institutions. The idea certainly deserves attention, for are there not men to be found among us, especially in the provinces, who practise on the lines of 1850 and 1860 to the detriment of their clients?

ANOTHER international exhibition in the United States is promised (or threatened), to be held in Atlanta, from September 18 to December 31 of the present year, under the title of the "Cotton States and International Exhibition." It is recognised by the United States Government, which has voted a considerable sum for a Government building and exhibit. The exhibition will include the following classes of exhibits:—

"Manufactures and liberal arts; machinery, minerals and forestry; agriculture; electricity; transportation; a woman's building; a fine arts building; and a negro building. It is not proposed, we are told, to build cheap imitations of the World's Fair buildings, or spend money on tawdry decorations, but rather to provide imposing and substantial roomy buildings, which will furnish ample space, well lighted and ventilated, for the display of every description of exhibits."

GERMAN technical publication has been collecting particulars as to the use of the shower-bath in public buildings. By this form of bath many of the difficulties which were incidental to the introduction of baths have been removed. A shower-bath occupies only an area of about 20 ft., of which rather more than half is necessary for the bath itself, and the rest for the dressing-room. The volume of water needed is moderate, $4\frac{1}{2}$ to $6\frac{1}{2}$ galls. being sufficient for barracks, and 10 to 10 $\frac{1}{2}$ galls. in prisons. About 39 gallons is considered a moderate consumption for an ordinary bath. In barracks a dressing-room common to all bathers can be used, and it has been found that eighteen shower-baths were sufficient to allow 400 soldiers to take their bath in an hour and a quarter. In prisons separate dressing-rooms are necessary, and ten minutes for each bath will be occupied. The cost is 0.06d. per head in barracks, 0.08 in schools, and 0.25d. in prisons. The cost of fitting up these shower-baths complete in an existing building would be 40l., a set of twelve costing 65l. to 75l.

A LARGE clearance that has just been made on the west side of St. John-street, Clerkenwell, involves the demolition of Swan-alley and the greater part of Peters-lane leading into Cowcross-street. In the latter thoroughfare were some curious old wooden houses, standing 100 yds. beyond the City boundary, with their backs abutting upon Swan-alley, and built after a mode of which now remain but very few examples in London, even much more remote from the City. At the corner of the lane is a public

house, the "Queen's Head," or "Market Distillery" (speedily to disappear), on whose front may yet be seen a stone thus inscribed:—"Opposite this place Hicks Hall Formerly Stood, 1 Mile 1 Furlong and 15 Yards from The Standard in Cornhill and 4 Furlongs 205 Yards from Holborne Bars down Holborn up Snow Hill, Cow Lane, and Through Smithfield." Hicks's Hall, whence were measured the miles along the great north road, was a building, 128 ft. by 32 ft., of two floors, in red brick, with a high-pitched tiled roof, and stood in the wide roadway of St. John-street. It was erected in 1612 at his own cost, by Sir Baptist Hicks, for the County Justices, who, until that time, had commonly met in the "Castle" Tavern, by Smithfield Bars, at the south end of St. John-street, through the present Meat Market: he gave it to them in 1618. Knighted in 1603, Hicks did not relinquish business as a silk mercer, to the no small umbrage of the Aldermen, in reply to whose remonstrance he said that his servants kept the shop, though he had a regard to the special credit hereof, and that he did not live altogether upon interest, as most of the Aldermen Knights did, laying aside their trade after nightfall. His shop was at the corner of Queen-street (then Soper-lane) and Cheap-side. Its site was taken for the recent widening of the former. In 1628 he was elevated Baron Hicks, of Ilmington, and Viscount Campden. The new Sessions House, on Clerkenwell Green, was built in 1779-82, at a cost of 13,000*l.*, after the designs of Thomas Rogers, and thither was removed a fine carved oak Jacobean chimney-piece from Hicks's Hall. In the old hall the regicides were tried, William, Viscount Russell, was condemned to death, and a packed jury acquitted Count Königsmarck of having procured the assassination in the Haymarket of Thomas Thynne. We may also mention here the demolition that is now in progress of some houses at Storey's-gate, together with the whole of Prince's-court, at the north end of Prince's-street, for the erection of flats, because John Wilkes was living in the court, in 1788, according to Timbs's "Curiosities of London." On January 4, 1890, we published an illustration of the tablet inscribed "Prince's-court"; it has no date, but long-ditch was re-named Prince's-street in the interval 1782-5.

THE general average of the Institute of Water Colours Exhibition seems, perhaps, rather higher than usual, at least the proportion of works that are interesting seems larger, though some of the best exhibitors send drawings that do not show them at their best. The President's round-shouldered young lady with a great want of general "figure," under the title of "Celia" (383), has a beautiful face, but is not otherwise attractive even in costume, which is not often the case with the works of this accomplished colourist. There are few figure subjects that are of any importance. Mr. Dollman's "Young Hopeful" (280) is one of its usual humorous groups, finished with his usual care. Mr. Wetherbee's "Weaving a Bond" (442) is a small idyll, noticeable as a good bit of colour; Mr. Fowler, in "Dreamland" (423), and "A Muse-Frequented Rill" (517), shows pleasant studies of ideal figures; Mr. Kilburne's "His Royal Highness" (458) is a work of some importance and humour. The chief attractions of the exhibition lie in the landscapes, among which are some studies of special effects which are powerful and interesting; Mr. Hope MacLachlan's paintings of night effects for instance, "The Harbour Channel" and "Over the

Bay" (49, 84), and Mr. Arthur Severn's study of the frozen Thames at Chelsea (380). Among landscapes of less exceptional (or eccentric?) aims is a beautiful one by Mr. Aumonier, "The Stream" (310), a very fine work in every respect. Mr. Joseph Knight pursues his usual aims in works that are somewhat conventional in colour and in the way of regarding nature, but are unusually good within their own scope, especially "Autumn" (144), which is also less mannered than usual. Among others of the best are Mr. Geo. Marks's "Evening's Quiet Hour" (56), a thoughtful and highly-finished drawing; Mr. Hine's misty picture on the Lewes Downs (108); Mr. Wimperis's "Yorkshire Moor" (115); Mr. Orrock's "Kenilworth" (156), where however the ruin and the landscape are pervaded too much by one tone; Mr. Stanley Inchbold's "Winchester to Rye" (391); Mr. C. E. Johnson's "Approaching Thunderstorm" (547); Mr. Wimperis's "View on the Downs near Slindon" (571). Mr. Weedon's "On the South Coast" (577), a good sea study, and Mr. Arthur Severn's large and perhaps rather sensational sunset effect, "Signs of Clearing" (630). Mr. J. Nash has made a spirited and interesting work of the incident of "The Rescue" (601) of the inmates of a disabled ship by the boat of a "liner," the long perspective of whose hull is very effectively drawn, and the group in the boat in the foreground is well studied. Architectural subjects are represented pretty fully and fairly, by such drawings as Miss Rayner's "Oriental, Oxford" (8), Mr. Shoosmith's "Oudezjds Kolk, Amsterdam" (19), Mr. Barratt's "Entrance to the Gold Mosque, Amritsar" (85), Count Seckendorff's "Windsor Castle" (176) a study in the courtyard; Mr. Brockbank's "The Bridge, Sandwich" (349); Mr. Aitken's "Corner of an Anglesea Village" (397), a very characteristic bit of village architecture; Mr. Fulleylove's "Blenheim Palace" (398) and several other works, and Mr. Alfred East's view in "Northampton" (463), with the fine old classical parish church seen on the right.

THERE is to be an exhibition of original drawings by Sir John Tenniel at the Fine Art Society's Galleries on and after the 30th of this month. This will be an artistic event of unusual interest, especially as no collective exhibition of the works of this great artist in black and white has, we believe, ever been held.

THE TRIBUNAL OF APPEAL UNDER THE NEW LONDON BUILDING ACT.

The following are the regulations as to the procedure to be followed in cases of appeal to the Tribunal, and the fees to be paid. These regulations have been drawn up by the Tribunal and approved by the Lord Chancellor in accordance with Section 184:—

"All communications shall be written, type-written, or printed on foolscap paper.

All drawings shall be on tracing linen and in duplicate.

Any further drawings or copies of drawings shall (if so required by the Tribunal) be supplied by the appellant.

Appeals shall be addressed to the Tribunal of Appeal, and shall be lodged, and the fee thereon shall be paid, at the office of the Tribunal, No. 134, Great George-street, Westminster, S.W., by hand, within the period (if any) prescribed by the Act; and, where no period is so prescribed, within fourteen days after notice of the decision, determination, certificate, requirement, or regulation appealed against has been given to or served on the appellant.

The appeal, which shall specify the section and sub-section under which it is made, shall be accompanied by copies of the original application and of the decision, determination, certificate, requirement, or regulation appealed against, with copies in duplicate on tracing linen of all plans or drawings relating thereto. These documents shall be supplemented by a short statement of the facts, setting out the grounds of the appeal, together with a list of the names and addresses of all parties to whom notices under the original application and of this appeal have been given.

The appellant shall also within the time limited

for lodging the appeal give notice of such appeal to the London County Council, and in cases where the original applicant is not the appellant, to such applicant; and in case of an appeal under any of the following sections, also to the persons mentioned opposite such section.

Section.	With Reference to	Persons to whom Notice to be given.
5 (6)	The Superintending Architect's determination as to the level of the ground.	The Superintending Architect.
13 (3)	The Council's determination that the prescribed distance shall be greater than 20 feet from the centre of the roadway.	The District Surveyor, The Local Authority.
15 (4)	The Council's consent to the erection, &c., of any building, &c., at a distance less than the prescribed distance from the centre of the roadway.	The Local Authority. The Owners and Occupiers of the nearest building on each side of the proposed building.
16	The refusal or conditional grant of Council's sanction under Part II. to Streets.	The Local Authority.
19	The refusal by a District Surveyor of his Certificate to plans of a building or structure to be altered or re-erected under Section 13.	The District Surveyor. The Local Authority.
25	The Certificate of Superintending Architect, as to general line of buildings.	The Superintending Architect. The Local Authority and all other persons entitled under Sec. 24 to notice of the Superintending Architect's Certificate.
29	The Certificate of the Superintending Architect determining in what street or streets a building or structure is situate.	The Superintending Architect. The Local Authority and all other persons entitled to notice of the Superintending Architect's Certificate.
43 (1) & (2)	The refusal of a District Surveyor to certify plans. The Council's determination in cases where a person desires to re-arrange a cleared area.	The District Surveyor. The Local Authority.
46	The Superintending Architect's Certificate determining the front and rear of a building.	The Superintending Architect.
47 (1) & (2)	The Council's refusal to allow a building to be erected to a greater than the prescribed height.	Such Owners or Lessees as the Council may under this section direct.
73	The District Surveyor's requirement respecting the construction of public buildings in case of disagreement.	The District Surveyor.
77	The District Surveyor's requirement respecting the conversion of any building into a public building in case of disagreement.	The District Surveyor.
122	The Council's refusal to permit, or any of the Council's regulations as to, or the decision of their Engineer, or conditions imposed on the Council's grant of a licence for the erection of dwelling-houses on low-lying land.	The Council's Engineer. The Local Authority.
132	The refusal of a District Surveyor to grant a Certificate as to sky-signs.	The District Surveyor.

All documents lodged with an appeal shall remain deposited in the Office of the Tribunal as records of the case.

After the lodgment of an appeal the earliest convenient appointment shall be arranged for the hearing of the appeal, and shall be communicated to the parties by letter. The fees in respect of the view (if any), the hearing and order shall be paid by the appellant before the hearing.

Appeals shall be heard at such place as the Tribunal may from time to time determine.

The hearing of appeals shall be open to the public.

The full Tribunal of three members shall sit to hear appeals.

The London County Council and the parties interested may appear before the Tribunal either in person or by counsel, solicitor, or agent, and the procedure at the hearing shall, subject to such variations as the Tribunal may think fit, be similar, *mutatis mutandis*, to that adopted on the trial of actions before the High Court, thus:—

Preliminary objections, if any, to be heard and disposed of.

Appellant to state his case and call his witnesses.

Respondent to state his case and call his witnesses.

Any other parties interested to be heard.

Appellant to reply.

* *Teste* "Dictionary of Architecture." It has, however, been claimed for John Carter (the "Architect" of the "Gentleman's Magazine," 1733-187), whose designs, dedicated to the Justices, are in F. Newbery's "Builder's Magazine, or Monthly Companion for Architects . . . by a Society of Architects" (1774-9). See the four plates; the similarity, in plans and elevations, is remarkable. Pownall modified the interior in 1860; an enlargement, southwards, was made in 1876.

The decision of the Tribunal shall be embodied in an order in writing under the seal of the Tribunal.

The original order and all documents relating thereto shall be filed and preserved in the office of the Tribunal.

Office copies, under the seal of the Tribunal, of orders and other documents shall be upon payment supplied to any party to an appeal, and shall be admissible in evidence for all purposes of the Act and Regulations to the same extent as the original would be admissible. All copies of orders or other documents appearing to be sealed with the said seal shall be deemed to be Office copies without further proof.

The file of documents shall be open to inspection by any person at the Office of the Tribunal between the hours of 11 and 3.

The fees to be paid to the Tribunal by the appellants and other parties are as follows:—

	* Higher Scale.	† Lower Scale.
Lodging appeal	2 0 0	1 0 0
View	2 0 0	1 0 0
Hearing	5 0 0	2 0 0
Order	2 0 0	1 0 0
Stating special case	2 0 0	1 0 0
Inspection of an order	0 1 0	0 1 0
... of file of proceedings	2 6 0	0 3 6

* Office copies, 6d. per folio. Plans, &c., according to work involved.

† Copies other than office copies, 4d. per folio. Plans, &c., according to work involved.

The preceding Regulations as to procedure and fees to be paid were made by the Tribunal of Appeal in accordance with the London Building Act, 1894, section 184. This twenty-first day of February, 1895.

For and on behalf of the Tribunal,

ARTHUR CATES,

Chairman of the Tribunal.

Approved: HERSCHELL, C.

March 1st, 1895.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

A SPECIAL General Meeting of this Institute was held on the 11th inst., Mr. F. C. Penrose, President, in the chair, to elect the Royal Gold Medalist for the current year.

The Chairman moved—“That, subject to Her Majesty's gracious sanction, the Royal Gold Medal for the promotion of architecture be presented this year to Mr. James Brooks, Vice-President, for his executed works as an architect.”

The motion was seconded by Mr. Charles Barry, and carried unanimously.

The tenth General Meeting (business) of the Session was then held, when the following gentlemen were elected:—As *Fellows*—William Henman (Associate), Birmingham; and Paul Waterhouse (Associate), London. As *Associates*—Thomas Kershaw, Halifax; William Hodgen, London; Ernest Edward Fetch, London; Frederick Bligh Bond, Bristol; John Pain Clark, London; William Edward Vernon Crompton, Wallgate, Wigan; Frederick Ernest Pearce Edwards, Liverpool; Henry Ernest Kirby, London; Charles Edward Bateman, Birmingham; Alfred Whitelock Field, Croydon; George Gunn, Ayr; Wilberforce Ernest Hazell, London; John Henry Price, Liverpool; Harry Tom Boden Spencer, London; George Augustus Bligh Livesay, Boscombe, Bournemouth; Alexander Paul Macalister, Cambridge; Thomas Harry Weston, Bristol; Henry James Wise, Gospel Oak, N.W.; Herbert Jeffrey Palmer, New Malden; Joseph Spain, Sunderland; Charles Septimus Errington, Newcastle-on-Tyne; Frederick Brice Hobbs, Waterloo, near Liverpool; Harry Wilson Pye, London; John Cadwallader Dewhurst, Belfast; William Edgar Gauld, Aberdeen; Robert William Horn, Glasgow; Vivian Herbert King, London; Alfred Henry Mills, Manchester; Thomas Aloysius Pole, London; George Patrick Sheridan, London; Percy Henry Adams, London; Harold Bailey, Hull; Percy Pavovich Cotton, London; William Adam Forsyth, London; Francis John Potter, London; Charles Henry Smith, London; John Borrowman, jun., London; Harry Ebenezer Budden, London; Frank Berdridge Cooper, Leicester; Archibald Campbell Dickie, London; Samuel Stevens Doughty, London; Arnold Seward Tayler, London; Harold Edmund Church, London; Henry Ingle Potter, London; Alexander Robert Hennell, Forest-hill, S.E.; Allan John Pinn, Exeter;

* The higher scale shall apply to cases relating to lines of frontage, laying out of streets, open spaces about buildings, height of buildings, conversion of buildings into public buildings, and low-lying lands.

† The lower scale shall apply to all other cases.

Sydney Benjamin Beale, London; Henry Ascough Chapman, Scarborough; George Coster, Bournemouth; Ernest Outram Cummins, London; Herbert Alfred Legg, London; George Oakley Scorer, London; Thomas Duncan Rhind, London; Luke Barlow, Manchester; John Laurie Carnell, Norwich; Hyla Edward Elkins, London. As Hon. Corr. Member: Louis Viollier, Architect to the Cathedral of Saint-Pierre, Geneva, of Geneva.

It was announced that the next meeting would be held on the 25th inst., when Mr. H. W. Burrows would read a paper on “Sound in its Relation to Buildings.”

THE ARCHITECTURAL ASSOCIATION: THE TECHNICAL TRAINING OF WORKMEN IN THE LONDON BUILDING TRADES.

The second sitting of the Conference on the Technical Training of Workmen in the London Building Trades, convened by the Architectural Association, was held at 9, Conduit-street, on the 8th inst., Sir A. Blomfield presiding.

The following representatives were present:—Sir A. Blomfield and Mr. E. T. Hall, for the Royal Institute of British Architects; Messrs. E. W. Mountford, W. H. Seth-Smith, F. T. W. Goldsmith, and Owen Fleming, for the Architectural Association; Mr. Mervyn Macartney and Mr. G. G. Frampton, A.R.A., for the Art Workers' Guild; Mr. T. G. Jackson, A.R.A., for the independent London architects; Mr. J. Verdon, for the Building Trades' Federation; Mr. J. V. Eva, for the Operative Bricklayers' Society; Mr. R. Thurston, for the Amalgamated Society of Carpenters and Joiners; Mr. G. Cole, for the National Association of Operative Plasterers; Mr. C. Hill, for the United Operative Plumbers' Association; Mr. J. Thomson, for the Operative Stonemasons' Society; Dr. Garrett, for the Technical Educational Board; Professor Banister Fletcher, for the Carpenters' Company; Mr. W. Grellier, for the Bricklayers' and Tylers' Company; Mr. R. Mitchell, for the Regent-street Polytechnic; Mr. C. T. M. Millis, for the Borough-road Polytechnic; Mr. W. R. Lethaby and Mr. H. R. Taylor, co-opted members; and Mr. Chandler, representing the Free Labour Association.

The Chairman drew the attention of the meeting to the fact that the following resolution was passed at the last sitting of the Conference:—“That this meeting be adjourned, and at its next meeting it discuss what steps can be taken to further technical education.”

The Honorary Secretary read letters of apology for non-attendance from Mr. S. J. Bird, Mr. Caröe, General Moberly and Mr. H. W. Burrows.

The Chairman said that as Mr. Bird, the mover of the resolution on the last occasion, was unable to attend, Mr. Mountford, the Vice-Chairman of the Conference, would have something to say.

Mr. E. W. Mountford said that on the last occasion when he occupied the chair, they had a good deal of preliminary work to get through, and hardly approached the actual subject to be dealt with. It appeared to him on thinking the matter over afterwards, that possibly they had commenced the Conference without making sufficient inquiry as to the best manner of meeting the necessities of the case, and he had ventured to invite a few gentlemen to meet at his office. They were favoured with the presence of several representatives of the Trades Unions, and in a perfectly informal manner they discussed what might be done to improve the technical education of workmen. He was very pleased to say that the representatives of the Trades Unions and the architects who were present, were unanimously in favour of, if possible, reviving the old system of apprenticeship, which had almost died out in London, and they had discussed many ways in which this might be brought about. It appeared that at the present time the large majority of workmen had never been apprenticed at all. They had to gain a knowledge of their trade in the best way they could; and it was nearly always done in a very irregular manner, the results often being quite unsatisfactory. The Trades Unions, he understood, were quite of opinion that if possible the old system of apprenticeship should be revived. If it could be insisted upon in some way that workmen must pass through an apprenticeship of at least five years, then if the boy left school, say at the age of thirteen, and was apprenticed for five years, it would bring him nearly up to the age at which he would

nominal become a man. It was thought, amongst other things, it would be well if a boy, on leaving school, should not be at once apprenticed to any particular trade, but that, if possible, he should be allowed to work as a sort of odd boy about a builder's yard, or on a building, as an errand-boy, or something of the sort. During these two years he might very well decide as to the trade he would eventually like to follow. That would bring him up to the age of about fifteen, and then five years' apprenticeship would carry him or till twenty, at which time he would be eligible to become a member of the Trades Unions, and probably be a master at his trade. There were many difficulties, however, in the way, and the first which presented itself to him was the necessity for a premium. It was pointed out that most builders insisted on receiving a premium with their apprentices, while the parents of the boys would very often not be in a position to provide this premium. They thought it possible the difficulty might be got over if the wages of the apprentices were fixed at such a low rate that the difference between the wages and the actual value of the work in the last two or three years of their apprenticeship would in itself compensate for the want of premium. They thought, for instance, that if a boy, during his five years, was paid at the rate of eight, ten, twelve, fourteen, and sixteen shillings a week the difference between that amount and the actual value of his services, in the last two or three years, at any rate, would form a kind of premium. They had discussed amongst other things the great desirability, if such a thing could be found possible, of allowing the apprentices to have one afternoon a week on which to attend technical classes at the Polytechnics or elsewhere, because, although these institutions were exceedingly valuable, it was thought that in practice a boy, who had been at work from six in the morning to five in the evening, could have little inclination to devote his evenings to studying the same kind of work he had been carrying on all day. It was hardly fair to expect a boy of sixteen or seventeen to give up sixteen hours of his day to the work of one particular trade, without any kind of recreation. They were told that at least one firm allowed their apprentices this one afternoon a week for study at the technical schools. He would not at present discuss this matter at greater length, and would only add that they were all unanimous in agreeing that the revival of the old system of apprenticeship was the best thing that could possibly happen. They found in their own calling of architects—that although they might teach young fellows all sorts of good things in the studios and classes of the Association, it was absolutely necessary that these same young men should be articled to an architect in practice, in order to obtain any kind of mastery of the work they would have to go through in after life. He believed some of the gentlemen present would be able to give figures and facts which would support the statement he had made.

The Chairman said they had listened with great pleasure to what Mr. Mountford had told them, though in some points it might suggest debate on matters beyond the scope of the discussion proposed for that evening—namely, what steps it might be desirable to take to assist those bodies already engaged in the technical education of workmen.

Mr. G. Cole (National Association of Operative Plasterers) said that nearly all that had fallen from Mr. Mountford was essential to be carried out, before it could be possible to obtain students for the classes. With regard to plasterers, they found it a mere impossibility to obtain students for the classes already in existence, and the Trade Unions, as the result of a thorough investigation, entailing a considerable amount of expense, had come to the conclusion that, until such times as the conditions under which the craft was carried on were changed, they would never get either students for the classes or even mechanics. Because, even if they were in possession of a highly skilled body of workmen, there was no demand for that skill, for the simple reason, that the majority of the builders in London were entrusting that portion of the craft to men who had no regard whatever as to how the work was done. Further than that, the men who did the work had no facilities at all to offer to an apprentice; they had no standing in the trade. One of the largest jobs in London at the present time was being carried out by a man who was practically a journeyman the other week. There would be some fine work in that building, and if done under different circumstances, a youth would have had some chance of learning something

there; but there would be no youths employed, because the man did not want them, he preferred somebody who was strong, and who had already been taught. Therefore, until such time as there were more facilities for youths to become apprentices to recognised employers, or master craftsmen, he was convinced that, as far as plastering was concerned, they would not get boys into the trade. A great many of them, in fact, were coming to the conclusion that in a short period there would be no plasterers in London, because it was absolutely the fact that no boys were coming into the trade. There were a few boys in the outlying districts being taught the first rudiments of plastering in cottages, and who gradually drifted into the centre of London and got work. These were never efficient workmen, and until such time as there was a system laid down whereby a boy could be apprenticed, the difficulty would not be overcome. His Society had approached the Central Association of Master Plasterers in London on the question, but he did not think they had been treated by that Association with the amount of courtesy they deserved.

Mr. J. Verdon (the Building Trades Federation) said he understood there was a representative of the National Free Labour Association present. He would like to know what trade that gentleman was, and what trade he represented?

The Chairman replied that Mr. Chandler was present as representing the Free Labour Association. He could hardly ask him what trade he was, as he had been invited to attend.

Mr. Chandler said he was present in answer to their invitation. Mr. Coleman, not being well, had asked him to attend.

Mr. Verdon wished to make a statement which would explain their position as members of the Trades Unions. In the first place, if a London mechanic wished to become a member of the Operative Bricklayers, Carpenters, or other Trade Unions, he had to be proposed and seconded by men who were members in such Societies, and who could guarantee that he was a man capable of earning his living at his particular trade. In order to ascertain the *bona fides* of the Free Labour Association, he had felt it his duty to make certain inquiries, and to get at certain facts. He had sent a labourer the day before down to the National Free Labour Association, who had registered him as a carpenter and joiner. No questions were asked of the man, who had paid nothing for registration. It seemed to him, therefore, that a costermonger might go there and be registered as a plumber and another as a carpenter. Whatever their individual opinions might be, with regard to the business before them, their presence would become intolerable in face of the information they had at command, and their members would not tolerate for a moment their sitting in company with representatives of that Association. They had had a consultation upon the question, and the delegates had made up their minds that however willing and anxious they might be that something should come out of the Conference, which would be for the mutual benefit of the architects, masters, and workmen, under the present circumstances it was absolutely impossible for them to retain their seats on the Conference when representatives of such a kind were allowed to be present.

Mr. Mountford, as President of the Architectural Association, which had sent out the invitations, said they had no desire to discuss Trades Unionism in any way whatever. He would moreover ask Mr. Verdon, how the presence of one man could possibly interfere with their discussion. It was hardly fair to spring this point upon them without a proper notice, because Mr. Verdon was aware that they had invited a representative of the Free Labour Association to be present at the last meeting, although no one had attended. It would, therefore, have been fairer to have given them some formal notice of the point, and he would appeal to Mr. Verdon to let the matter go over. They were there in the character of hosts, and could not possibly, even if they were desirous of doing so, ask any gentleman to retire whom they had invited to be present.

Mr. Chandler remarked that he had no desire to disturb the harmony of the meeting, and in fact he would be ready to withdraw if the chairman desired it.

The Chairman asked the meeting to go back to the resolution before them. Any disputes between gentlemen invited to attend the Conference, and matters not bearing on the resolution, he should have to rule out of order.

Mr. Verdon said that when the invitation came through the trades, it was understood that there

should be one representative plasterer, one bricklayer, one mason, and so on. He himself did not represent a trade, but the Building Trades Federation, and if Mr. Chandler would withdraw he would be willing to do the same, leaving the delegates of the Trades to settle the matter.

Mr. Seth Smith believed that a considerable amount of the responsibility of inviting a representative of the Free Labour Association rested with him. It seemed, as two sides existed to the industry, it was fair that the Free Labour Association should have some representative present at the Conference.

Mr. R. Thurston said that as representing the Carpenters' Society they were interested in the question of technical education, and the raising of the standard of work. He put it to them, however, how could the members present sit with a gentleman representing an Association which would willingly register a labourer as a carpenter? His instructions were that unless *bona fide* representatives were present to discuss this question he would be unable to retain his seat on the Conference.

Mr. Cole expressed the same feeling.

Mr. E. T. Hall remarked that the question before the meeting was not one of the Trade Unionists or the Free Labour Association, but a desire to see tradesmen improved in education, and to get English craftsmen to be the first in the field. Their desire had been that they should lay their heads together and see what could be done for the education of young men. There was no trades unionism amongst the architects, and if the trades unionists present could not remain as members of a congress in which a non-unionist was present, it would seem to follow that they could not work with architects, who were practically in the same position as members of the Free Labour Association. He hoped they would let the incident pass and give the congress the benefit of their advice on the question before them.

Mr. Chandler said that although such a registration might have taken place as had been mentioned, they would soon find out what the man could do. He had come there simply to listen, because he had been asked to do so, and he did not see why the presence of a simple individual like himself should have so terrible an effect on the nerves of the Trade Unionists that they should be unable to remain.

The Chairman could not allow this discussion to go on, as it was likely to become interminable. At the same time he could not call upon a gentleman who had been invited to withdraw. He hoped the instructions of the delegates were wide enough to allow the discussion to go on, quite apart from the point that had been raised.

Mr. Chandler again intimated that he was ready to leave if the Chairman desired it.

The Chairman said that could not be done, and the representatives of the Trade Unions then left the room.

Mr. Mountford remarked that there was no other way in which the Chairman could have acted. He regretted that the Trade Union representatives had thought it necessary to withdraw. Acting under instructions from their organisations they had no other alternative, but the question of trades unionism *versus* free labour could never arise at this Conference. These gentlemen had met at his office, and had discussed the matter in the most friendly way, the result of the discussion having been as edifying for the architects as for the workmen. However, the best thing to do would be to continue the discussion in the absence of those gentlemen, and on some future occasion they might find it possible to attend again.

Mr. Owen Fleming said he had been connected with the movement from the beginning, and would be glad to go on with the discussion. It seemed to him, however, that it would be futile; it was no use having people representing only one side of the question, and without the presence of the workmen they could not do anything. If, therefore, considered the best thing would be to adjourn the sitting pending negotiations with the representatives of the trade societies.

Mr. Hall said that they had heard from Mr. Mountford the views which the gentlemen who had just retired had taken, and therefore Mr. Mountford had been the spokesman of the workmen. The meeting, however, had a definite proposition before them which deserved the greatest consideration. Had there been present some representatives of the building trade, they could have gone on with the discussion with some advantage, and he thought they might even still discuss the matter. He believed every architect in London had an earnest desire to see the apprenticeship movement revived, as that was a system which of necessity must turn out better men than

those who were now coming up. He did not mean to say that they could not get good work done in London, because it was notorious that excellent work was done there, but everyone must have observed the casual way in which the young fellows came out. In fact, it was only after earning wages that they got to be good workmen when about thirty years of age or beyond. The proposal was that there should be an apprenticeship for five years, that the apprentice should be paid small wages, and that being tied down for a certain period he should by his services, which would become valuable at the end of three years, as it were, pay the premium rather than pay it down at once. One of the difficulties the masters might raise was that, whereas if they had the premium paid to them there was a certain security that the apprentice would serve his time; if he paid no premium, the moment he became a competent workman he might leave, and the employer would not get the benefit of his two last years. The apprentice might retire from his indentures, and it would be exceedingly difficult to get the courts now-a-days to compel him to remain for the full term. He doubted if, in the present state of feeling of society, any magistrate would commit a young man to prison for breach of his indentures. The builder would have to bring an action against the youth for damages, which would be useless, because the young man would have no money, and that was the practice! difficulty of the scheme Mr. Mountford had propounded. In the one case there was security in the hand of the builder that the young man would serve his term, while in the case of the suggestion now before them there was no security; possibly, however, by the aid of the guarantee societies the difficulty might be got over. With regard to young men having one afternoon-a-week off to attend technical classes, he believed that the Technical Institutes would be only too pleased to open classes whenever a sufficient number of students presented themselves to pay the working expenses. So as to prevent any disorganisation of builders' work, a certain number of apprentices might get off one day and a certain number another day. Three or four years ago the Royal Institute of British Architects published a form of articles of pupillage for young architects, in which there was a condition that the master should give his pupils facilities for attending architectural lectures and classes, therefore they had that as a precedent to lay before the Builders' Society with some weight.

Mr. Millis believed the question was not altogether a matter of premium, but whether employers would take apprentices or not. He believed there were a number of charitable institutions at the present time which had funds they were willing to devote towards paying the premiums of apprentices; but in many trades there had been difficulty in finding masters who would take apprentices. Employers of labour in many industries had stated openly that they were perfectly willing that lads should come into their works, and pick up the trade, but they would not be bothered by having indentured apprentices. Until employers could be got to look at the question of apprenticeship from a different point of view, it was scarcely necessary to consider the question of premium. With regard to the lads being allowed a half-day weekly to attend classes, a more reasonable suggestion would be to permit them to leave off at 4:30 or 5 o'clock and attend classes at those hours on two days a week.

Mr. Hall remarked that they now left off at five o'clock in the building trade.

Mr. Millis, continuing, said that no doubt the London Polytechnics, with the funds they had, would be ready to place their laboratories and workshops at the disposal of young men one day a week, and it would not be a question as to whether the classes were even self-supporting. None of their classes were self-supporting at the present time, and they did not expect them to be so.

Dr. Garrett stated that apprentices were largely employed in the north-country engineering works, and also by the great railway companies, and in some cases the employers paid their class fees. That there were some satisfactory students might be proved by anyone who would take the trouble to visit some of the workshops of the technical institutions, such as the brick-cutting work at Battersea Polytechnic. The Technical Education Board had, during the last few weeks, been occupied in making a somewhat exhaustive inquiry amongst the employers of labour in the building trades, with reference to the question of apprenticeship, and he hoped that during next month the results would be printed, and available at any rate for

private circulation. He was not prepared to say that these results had been altogether satisfactory, as the masters did not, so far as inquiries had gone, show themselves very keen upon taking apprentices. One of the chief objections was that an apprentice would take up the space in a workshop which could be more profitably occupied by a thoroughly qualified workman, especially in London, where the rents were so high. He was afraid a premium would not get over the difficulty, unless it was fixed at a higher sum than public bodies were prepared to pay. If reasonable premiums could be accepted, he did not think there would be so much difficulty in finding the premiums as some people thought.

Mr. Seth Smith believed there were schools of apprenticeship in France and in Germany, the aim of which was to supplement the rather decaying system of apprenticeship, and these schools were largely subsidised by the Government. It would be interesting if they could have some information on that subject.

Professor Banister Fletcher said that five years ago he made many inquiries on behalf of the Carpenters' Company regarding apprenticeships, and, as the result of these inquiries, they had determined they could not force apprenticeships at the present time. With regard to the building trade, there seemed to be an absolute difficulty in the matter. One difficulty that had not been alluded to was that, in the present day, the class of boy who was apprenticed seemed by his mere apprenticeship to lose his desire to work. The working classes seemed to think that the master was getting more out of his apprentices than he ought, and that was one of the causes why masters did not care to have the boys. One reason was the difficulty of having sufficient accommodation for boys, while they were improving, and another reason why apprentices had died out in London was, that masters could get young men from the country, where they had learned a good general knowledge of the trade, and they preferred to have such workmen rather than to train them in their own shops. Then the speculative builder could take in boys, who could do the work well enough for them, and they paid, he was informed, better wages than builders did who had taken apprentices. They had also the greater freedom of leaving when they liked. Boys did not like to be apprentices for a lengthy term. He believed the only system to be pursued to raise the standard of the work produced by British workmen was by evening handicraft schools like those the Associated City Companies had established at Great Titchfield-street.

After some further discussion it was decided to adjourn the meeting.

On the motion of Mr. Mountford, a cordial vote of thanks was passed to Sir Arthur Blomfield for presiding, and the proceedings terminated.

ARCHITECTURAL ASSOCIATION SPRING VISITS:

THE ORATORY, SOUTH KENSINGTON.

THE fourth visit to works in progress was paid on Saturday last to the Oratory at South Kensington, to view the completion of the front and the erection of the outer dome and lantern. The visit was arranged by the Hon. A. McCarell-Hogg, one of the visits' sub-committee. The completion of the front consists in the building of the portico of coupled Ionic columns, with a vestibule on either side, forming the aisle entrances to the church, and also the lower portions of the twin southern towers, to be erected at a future date. The baptistry is situated in part of the lower portion of the eastern tower, and contains a very fine font of many coloured marbles—a copy of one from a church in Brescia. The whole of the front is erected in Portland stone from the Whited. Mr. Shaw, the clerk of works, explained the drawings, and conducted the party over the building.

The façade has been detailed by Mr. Shaw from the original design of Mr. Gribble. The central gable will be crowned by a figure of the Virgin, 9 ft. in height, by Mr. Collett, who has worked at St. Paul's under Mr. Penrose. Proceeding through the church, Mr. Shaw explained the general scheme of the gorgeous coloured marbles to the various altars: some had been designed by Mr. Gribble, and one had been brought from Brescia, and is an exceedingly fine specimen of the rich Later Renaissance. The members then mounted the west circular staircase to the dome. The inner dome, which is constructed in concrete, has been built from the beginning, but an eye is now to be opened in its centre and a passage formed round it. The

present work consists in the addition of the outer dome and lantern. This, we believe, is the gift of an anonymous donor, who, however, stipulated that it should be carried out by his own architect, taking by this action, surely, largely from the value of the gift. Mr. Sherrin is the architect of this portion, and he has departed considerably from the original architect's design, which embodied a stone lantern as the crowning feature. The whole of this outer dome is constructed with a steel framework by Messrs. Westwood, of Millwall. The diameter is 58 ft., the height to the top of the ring-girder supporting the lantern is 37 ft. This ring-girder is about 15 ft. in diameter, and from it to the top of the cross is 47 ft., bringing up the whole height of the dome and lantern to 84 ft., the total height from the ground being 200 ft. The ribs of the framework consist of eight principal trellis-girders bent to an elliptical curve, and having two intermediate smaller girders between each. The main girders are connected horizontally by three continuous circular purlins, forming the whole into one rigid mass. The lowest of these is in tension, the middle is neutral, and the upper in compression. A tie-ring further connects the principal ribs at the base by surrounding them and preventing them from spreading. Following the curve of the dome are horizontal wood rafters planed to the curve out of 9-in. by 3-in. stuff and bolted to the girders. These are covered with $\frac{3}{4}$ in. boarding in two thicknesses laid diagonally, in opposite directions, and covered with 7 lbs. lead; least of 8 lbs. being used for projecting features. The ball and cross are to be covered with copper. The wood lead-covered lantern is supported on eight posts 10 in. by 6 in., bolted to the circular ring at the top of the outer dome, &c., and further secured by double steel angle struts from the main ribs to a circular girder 7 ft. 6 in. above this main ring, thus giving a leverage of about 10 ft. 6 in. The leadwork is laid round the main girders by means of 4½-in. breaks. A detailed examination of the working drawings followed, and a vote of thanks was unanimously accorded to Mr. Shaw for his kindness in conducting the party.

ARCHITECTS' BENEVOLENT SOCIETY.

THE annual general meeting of the subscribers and donors to the fund of this Society was held on Wednesday afternoon in the Council Room of the Royal Institute of British Architects, Mr. F. C. Penrose, F.R.S., President, occupying the chair.

The Chairman, in opening the proceedings, briefly referred to the loss which the Society had sustained in the death of Mr. Ewan Christian, who, though advanced in years at the time of his death, was full of work and energy.

The minutes of the last meeting having been read and confirmed, Mr. Percival Currey, hon. secretary, read the following report of the Council:

"It is with more than ordinary satisfaction that the Council of the Architects' Benevolent Society have the pleasure of submitting their forty-fifth annual report. During the past year the Society has attained its greatest degree of financial prosperity, both with regard to capital and income, since its foundation, and with the larger means at its command its sphere of usefulness has been correspondingly extended.

As a special effort was made by the Honorary Treasurer in 1893, with favourable results, to increase the capital of the Society by donations, it was not expected that a large amount would be realised in this direction last year. The actual amount received in donations was £27,148, to which Mr. W. Willmer Pocock contributed the handsome sum of £500, and Mr. William Harrison, Mr. Ernest George, and Mr. Maurice Hulbert, have contributed £5 ss. each. Mr. Arthur B. Plummer (who, as Local Honorary Secretary at Newcastle-on-Tyne, has taken a diligent interest in the welfare of the Society) has contributed £1.

In regard to subscriptions an important advance has been made. Including the 194, 195, which in 1893 were paid in advance for subscriptions, and which appeared in the income account issued for that year, the total amount of subscriptions received for 1894 was £357,298. A further sum of £254,48 was received for arrears which, in many instances, covered the subscribers' arrears for a period of three or four years, and it is cordially hoped that the few subscribers whose names appear on the books of the Society with outstanding amounts, will follow such a good example and clear off their arrears.

The Council have great pleasure in acknowledging the deep indebtedness of the Society to the unceasing and active interest which the hon. treasurer (Mr. Arthur Cates) takes in its affairs. Since 1890, when Mr. Cates undertook the office, the Society's invested capital has increased from £7,026, 148. 10d. to £9,363, 28. 10d., and the income

derived from subscriptions has increased from £308, 128. to £457, 198; and the Council desire to record their recognition of the fact that this notable advance in the financial stability is mainly attributable to Mr. Cates's untiring effort and zeal in behalf of the unfortunate members of the architectural profession and their families who are unavoidably left in necessitous circumstances.

It should be added that, in addition to the amount of capital stated above, £50, were transferred from Income Account to Capital Account, with the object of purchasing 1007. Caledonian Railway 4 per cent. Debenture Stock, but the purchase was not completed by the end of the financial year. The actual amount, therefore, in investments and cash standing at the credit of Capital Account on 31st December was £9,532, 118. 6d.

Six meetings have been held by the Council during the past official year. One pension of £30, and two pensions of £20, have been paid, and the sum of £102, has against 397l. in 1893, being, with one exception, the largest amount ever paid in one year by the Society to applicants for relief, has been distributed among thirty-three persons. A pension of £20, became vacant through death, and the vacancy was duly announced and applications invited in the *Builder*, with the result that the pension was awarded to an aged architect in straitened circumstances. In a few instances the Council have come to the aid of younger architects who have been placed in temporary difficulty, through ill-health or some other cause, with the happiest results.

The Council have to record with great regret the death of Mr. L. Colonel Haywood, Mr. Edward Clark, Mr. H. Francis, Mr. Samuel Hill, Mr. James Murgatroyd, and Mr. Wyatt Papworth, all of whom were contributors to the Society.

The following gentlemen, having served three years, retire by rotation from the Council, namely:—Mr. W. Hilton Nash, Mr. J. G. Finch Noyes, Mr. Andrew Oliver, Mr. Charles J. Shoppee, and Mr. Arthur Ashbridge. To fill the vacancies caused by these retirements, and by the resignation of Mr. John H. Christian, the Council have the pleasure to nominate Mr. Thomas Harris, Mr. H. C. Boyes, Mr. W. Kidner, Mr. G. Scamell, Mr. Zephaniah King, and Mr. George Inskip, all of whom have consented to serve if elected.

The balance-sheet and income account for the year ended December 31, 1894, duly audited by Mr. Thomas Harris and Mr. George Scamell, are here-with submitted.

The Council, in closing this report, desire to express the obligations of the Society to the Royal Institute of British Architects for the use of rooms in which to hold the meetings, to the secretary (Mr. William H. White), and to the officers, whose invariably helpful courtesy has greatly facilitated the prompt and economical administration of the Society's business."

Mr. Currey also read, in the unavoidable absence of the hon. treasurer, Mr. Arthur Cates, the statement of accounts and balance-sheet, and in doing so he mentioned that a donation of seven guineas had been received from Mr. W. Emerson and one guinea from a new subscriber, Mr. H. G. Ibberson.

The President then moved that the report and balance-sheet be adopted. This having been agreed to,

Mr. G. Scamell moved and Mr. Percy Hunter seconded a vote of thanks to the outgoing members of the Council—viz., Mr. W. Hilton Nash, Mr. J. G. Finch Noyes, Mr. Andrew Oliver, Mr. Charles J. Shoppee, and Mr. Arthur Ashbridge. The motion having been carried,

Mr. Shoppee moved, and Mr. H. L. Florence seconded the following resolution, which was agreed to:—"That the Council for the year 1895-96 be elected as follows: President, the President of the R.I.B.A., Mr. Thomas Blashill, Mr. Sydney Smirke, Mr. William Grellier, Mr. E. B. l'Anson, Mr. E. H. Martineau, Mr. T. M. Rickman, Mr. R. St. Aubyn Roumieu, Mr. J. T. Wimperis, Mr. Thomas Harris, Mr. H. C. Boyes, Mr. W. Kidner, Mr. G. Scamell, Mr. Zephaniah King and Mr. George Inskip."

Mr. Shoppee also proposed "that Mr. Arthur Cates be re-elected hon. treasurer for the year 1895-96, and that a vote of thanks be passed to him for his services during the past year."

Mr. E. B. l'Anson seconded, and the motion was agreed to.

A vote of thanks to the auditors, Messrs. T. Harris and G. Scamell, having been agreed to, Messrs. W. Hilton Nash and J. G. Finch Noyes were elected auditors for the ensuing year.

On the motion of Mr. D. Brandon, seconded by Mr. S. Smirke, Mr. Percival Currey was re-elected hon. secretary for the year 1895-96, and a vote of thanks was passed to him for his services during the past year.

Mr. Currey proposed, and Mr. l'Anson seconded, a vote of thanks to the Royal Institute of British Architects for affording office accommodation to the society.



ACCEPTED DESIGN FOR NEW VESTRY HOUSE



THE -- MESSRS. MURRAY & FOSTER, ARCHITECTS

This was agreed to, and the Chairman (Mr. Enrose) replied on behalf of the Institute.

On the motion of Mr. Smirke, seconded by Mr. Shoppee, a vote of thanks was accorded to the President for presiding.

The Chairman briefly replied, and the meeting terminated.

CARPENTERS' HALL LECTURES.

"ORIENTAL ARCHITECTURE."

THE first of a course of five lectures on matters connected with building, arranged by the Carpenters' Company, was delivered on the 6th inst. by Professor T. Roger Smith, F.R.I.B.A., who took for his subject "Oriental Architecture."

The lecturer, briefly introduced by the chairman, the Master of the Company, said that among the things that differed, as between the Oriental and the European, were the arts, especially architecture, and as there were great differences as well as—from the European point of view—novelties in Oriental buildings, it had seemed to him worth the while of those present to see a few photographs of some of them, and to get some account of their architectural character. They all knew something of the fine works of art of the small sort that came from Eastern countries; but Asia was far off, and buildings were not brought over. When travellers went there they saw new objects combined to attract their notice, so that architecture was less considered, but seldom described, and more rarely photographed or illustrated than scenery, costumes, and the strange manners and customs of a new continent. There was, however, a most extensive and remarkable series of buildings in the principal eastern countries, namely Egypt, Persia, India, China, Burma, and Japan. Having briefly given his reasons for chiefly selecting buildings in India, the Professor said that in all the countries he had named the buildings differed from any in Europe. They differed extremely from one another, but they also had a something in common which they agreed to call Oriental character. Three conditions of life which were all apt to exert a great influence upon architecture were very different in Asia from the same conditions as they knew them in Europe. These were climate, race, and religion. They were dealing with buildings in a hot climate, and a climate where sunshine was far brighter than in Europe. Buildings in the East accordingly had small openings where lighting was concerned, but very large ones where it was a question of admitting light, and Eastern roofs were mostly flat. As architects, most Asiatic races had a much greater love of ornament and a much keener appreciation of colour than Europeans, but less sense of dignity and sobriety, and all this was reflected in their buildings. All the best buildings of nearly all the great religious buildings in Europe were of the same type of resemblance between the Christian churches. In the East a vast proportion of the religious buildings were Pagan, and another proportion were Mohammedan, so that temples or mosques, not churches, were built there. There thus existed good reasons why Eastern buildings should differ from Western ones, owing to the architecture of India, the lecturer said that country possessed architecture and sculpture before the date when Caesar was fighting over the forefathers, and it had in some sort prevailed there ever since. Being a country of enormous extent and very ancient civilisation, there were naturally a great many ancient cities in India, not a few of them adorned by palaces or strongholds, but all of them by religious buildings. Superstition and religion were inextricably interwoven with every part of each man's life in that country, so it was not surprising that temples, shrines, or mosques, and tombs would abound. Many of the buildings were extensive or were grouped together in vast series; all of them were elaborate, and though to European taste there was something strange and uncongenial in many of them, and here and there perhaps even something repulsive, there were few which were not curious, many that were wonderful, and not a few of which the beauty only appeared to be enhanced by the strangeness. Four forms of religious belief had been prominent in India. The remains of the ancient Buddhist monuments in India were of great interest, but they included very few actual buildings, as the temples and monasteries, except such as were artificially made—caves dug out of the solid rock—had disappeared. After a brief reference to the Jain religion and to its temples being in many respects similar to those of the Buddhists; to the phallic or Hindu worship being carried on

in innumerable temples, with all kinds of dependencies; and to the Mohammedan religion, the Professor said the most prominent characteristic of Indian architecture was the profusion and endless repetition of ornament. It began with the earliest Buddhist remains, and lasted to the present day. In some of the Mohammedan buildings, it was true, they sometimes found contrasts between a bit of plain wall and the enriched features built into it. Such contrasts were indispensable if the enriched work was really to look rich, and they were used with great skill by Saracenic architects in more westerly countries. But the idea of the Indian artist had mostly been the false notion that the more profuse the ornament the more ornamental the building became; and the walls, roof, pillars, and, in fact, every part, inside and out, were usually covered by carved or embossed, or sometimes painted or inlaid enrichment. The next feature was the prominence of high roofs, which were more conspicuous than in any European style. A tall, pyramidal structure surmounted the gateway that gave access to a temple enclosure, and another crowned the temple itself. They varied in form, in richness, and in number—in the south they were pyramidal, and in the north gourd-shaped—but they were undoubtedly the most striking and the most peculiar features of Hindu architecture. They were not reproduced in Mohammedan buildings. A Mohammedan tomb always, and a mosque sometimes, was surmounted by a dome, or by many domes, but never by a high roof. A third feature was a bracket cut in stone or wood, which was continually met with in the interior of Indian buildings. This was usually of a shape which suggested that to be of any service in assisting to carry a superincumbent weight it ought to be of tougher material than stone. A fourth feature, occurring both in Hindu and Mohammedan architecture, was the use of slabs of pierced stone for windows, and these were often of the greatest possible beauty. The Buddhist monuments of India were of great interest and great antiquity, and on them the Indian love of profuse ornament was remarkably shown. Among the oldest of these monuments were what was known as stupas or stūpas, being places for the display or deposits of relics. The most important ones were solid hemispherical mounds of great size, with a small structure on the very summit, and round the base of the mound there was a double fence of posts and rails of timber, and in later years of stone—protecting a procession-path that encircled the mound, and to which access was gained through portals formed of the same materials. Photographs were then thrown on the screen illustrating two such stupas, and Professor Smith drew particular attention to the profuse stone-carving shown thereon. Proceeding with his remarks, he described a Hindu temple of the first rank, which, he said, was a large group of structures in a vast precinct or enclosed space. The exterior of everything was made elaborate, but it was chiefly the sanctuary and its roof, the porch and the gateway, upon which the greatest degree of ornament was lavished. He referred to many-storied southern temples being "alive with sculpture." In more than one of the large temples, halls of 1,000 columns occurred, and at least one possessed pillared corridors 700 feet long. Orissa was the province where the northern style was best seen. Here the high roof was no longer a pyramid, but was a lofty structure of a gourd-like outline known sometimes as an Orissa dome. Every trace of the arrangement in stories conspicuous in the south had disappeared, and the ornamentation, the character of which was extremely different, now formed ribs from base to summit. A few southern Hindu temples, and one or two northern ones were afterwards shown. The lecturer pointed to the infinite profusion of carving, and said that in its way it was artistic and effective, but the amount of labour expended must be almost incalculable. Continuing, he said they now came to what to his mind was the most interesting part of the architecture of India. The Mohammedan religion, with all its fillings, was a far better religion than the Hindu, and it had been associated with a higher architectural style, a style which was, perhaps, seen at its very best in Egypt, but which in India flourished extremely. Mosques, tombs, and palaces, as well as minor works, filled the Mohammedan cities of India with objects of interest and beauty, and the finest were at Delhi, Agra and Ahmedabad. One leading peculiarity of Mohammedan architecture everywhere was that all representations of living things were strictly forbidden as being idolatrous,

so that the ornaments had to be foliage or geometrical patterns and coloured ornaments. These—the geometrical forms especially—had been brought to a very great pitch of perfection by the Arabs, the Egyptians, and the Indians. The Hindu architecture was swarming, so to speak, with life, and yet the Mohammedans, who had to forego this capital mode of ornamenting buildings, surpassed the Hindus. Professor Smith described at length the mosques used by the Mohammedans, and had several pictures of them thrown upon the screen. He drew particular attention to the detail work, especially in the case of what he described as exquisite panels of scroll work of conventional foliage, thoroughly Saracenic, and yet harmonising well with all around them. One of the most brilliant and the best-preserved specimens of Mohammedan art in India was the Taj at Agra, built as his own burial-place by Shah Jehan, 1628-58. This was a splendid domed tomb, of white marble, built on a platform, overlooking the river on one side and a lovely garden on the other side. The Professor held this to be the climax of perhaps the most artistic and most effective of all the architectural styles that had flourished in India during the 2,000 years over which her architectural history extended. A photograph of this and other buildings brought the lecture to a close.

On the motion of the Chairman, a hearty vote of thanks was accorded to Professor Roger Smith or his very interesting lecture.

ARCHITECTURAL SOCIETIES.

CARLISLE ARCHITECTURAL, ENGINEERING, AND SURVEYING SOCIETY.—On the 6th inst. a meeting of this Society was held, when Mr. Glover, Assistant-manager of the Carlisle Gas Works, read a paper on "Some Modern Methods of Lighting Compared." Starting with a very brief history of the origin and extent of gas lighting, the lecturer defined the necessary qualities of artificial light to be as follows:—Steadiness, reliability, convenience, safety, and freedom from injurious properties likely to cause air pollution or injury to health. A table shown demonstrated that all illuminants, with the exception of the electric light, caused air pollution, and that, contrary to ideas prevalent in many persons' minds, gas caused the formation of less carbonic acid than either oil or any description of candles. The propriety of enriching a poor gas of, say, 15 c.p. to 19 c.p. by means of cannel coal-gas, costing 1½d. per 1,000 cubic ft., was questionable, but with enrichment by means of oil-gas at ½d. per 1,000 cubic ft., there could be no doubt of the wisdom of such a course. The importance of good fittings was shown in a striking way experimentally, and the desiderata for a good burner were enumerated, attention being bestowed upon the use and advantages of governors, fixing these on the burners themselves being preferable to fixing one governor close to the meter, as in the former manner the advantages of high pressure to stoves, &c., might be realised. The regenerative light was then described, together with the latest invention in incandescent gas-lighting, "The Welsbach," which the lecturer considered one of the greatest advances made in the science of gas-lighting, to popularise its use, and to compete successfully with the electric light. The use of petroleum oil as an illuminant was then touched upon, and finally the electric light was considered, its weak points being the loss that occurs in the conversion of coal energy into electric energy, and in the distribution of the two illuminants, the loss in gas distribution being from 4 per cent. to 10 per cent., while in electricity the leakage sometimes amounted to 40 per cent. The failure from an economical point of view of accumulators also militated against the success of electricity, though the lecturer expected to see further strides made in the progress of the science in a few years. The lecture was illustrated by many drawings, diagrams, and specimens of lamps, burners, meters, &c.

GLASGOW ARCHITECTURAL ASSOCIATION.—The annual business meeting of this Association was held on the 5th inst., in the Rooms, 114 West Campbell-street, the President (Mr. A. N. Paterson) in the chair. The seventeenth annual report, which was read by Mr. W. R. Watson (Secretary), narrated the work of the Association during the past session. Memorials, it was stated, had been addressed by the Association to the Town Council relative to the proposed removal of the Iron steeple, and to Her Majesty's Office of Works with reference to the repairs in progress at the cathedral. The most noteworthy event of



Plan of Design for Darlington Municipal Buildings.

the session had been the successful arrangement of a scheme of co-operation with the Glasgow Institute of Architects for the acquisition of premises to be jointly occupied by the two societies. Owing to the difficulty of finding suitable accommodation, the arrangement was deferred in the meantime. The Association Travelling Studentship, of the value of ten guineas, had been awarded, after a close competition, to Mr. George Gunn, member. Mr. Fraser (hon. treasurer) submitted the financial statement, after which the report was approved of. The following officers were elected for the ensuing session:—Honorary President, Mr. Malcolm Stark, jun.; President, Mr. Alex. N. Paterson; Vice-President, Mr. Wm. Tait Conner; Secretary, Mr. Walter R. Watson; Assistant Secretary, Mr. Hugh Dale; Treasurer, Mr. George Hill; Librarian, Mr. Alex. McGibbon; General Committee: Messrs. Wm. J. Anderson, George Copland, Wm. Fraser, Robert J. Gildard.

ARCHITECTURAL SECTION, GLASGOW PHILOSOPHICAL SOCIETY.—The eighth ordinary meeting of the Glasgow Philosophical Society was held on the 6th inst., conjointly with the Architectural Section of the society, when Colonel Robert W. Edis, F.S.A., F.R.I.B.A., gave an address on "Internal Arrangement and Decorative Treatment of Town Houses."

EDINBURGH ARCHITECTURAL ASSOCIATION.—The Edinburgh Architectural Association met on the 6th inst. in the Royal Institution, Mr. W. W. Robertson presiding. After the transaction of some formal business, Mr. A. Hunter Crawford read a paper on "The Suburban House." We were leaving behind us, said the lecturer, the idea that the portico of a Greek temple might be adapted to the porch of a suburban house, and we even thought now that the perfect propriety and respectability of Newington might be improved upon. The typical plan of the builder was inconvenient, unsatisfactory, and commonplace. It was awkward without quaintness, and externally lacking in character. A well-designed house was homelike from the outside, convenient in its arrangements, and interesting in its features. A good plan greatly depended on the size and arrangement of the hall and staircase, on the pantry and its relation to the dining-room, kitchen, and entrance, and on the limited space wasted in passages. The lecturer illustrated by limelight views good and bad types of plans, and then proceeded to contrast stone and brick houses, advocating a freer use of brighter and warmer materials. Characteristic work by Messrs. R. Norman Shaw, R.A.; George Sherrin, Ernest George and Peto, C. F. A. Voysey, Ernest Newton, E. J. May, and other architects was shown on the screen. The lecturer then referred to varied treatments of staircases, bedrooms, and ingle-nooks, and closed his paper by expressing the wish that greater attention be given to the design of our houses, more particularly the smaller ones, and that Edinburgh might not only be noted for her beautiful situation, but also for her charming suburbs.

Illustrations.

COMPETITION DESIGN FOR DARLINGTON MUNICIPAL BUILDING

AS we are publishing in this number the accepted design for a new vestry hall, we couple with it one or two other designs of the same class, comparison of architectural treatment for buildings of a similar class being often interesting and useful.

Mr. Briggs' competition design for the Darlington municipal buildings, as a design made from "classic" materials, it has considerable originality combined with refinement and repose of effect, and is noticeable also as an attempt to treat municipal buildings without the now almost inevitable tower.

The fall of the ground was proposed to be utilised so as to get the floor of the public hall on what is the basement level of the other portion of the building.

The three gables in the entrance front do not seem quite sufficiently expressive of the actual facts of the plan, and it might, perhaps, have been better to emphasise and raise the central projection, as marking the entrance, though it must be admitted that this would have somewhat altered the general character evidently aimed at in the design. The treatment of the small partially rusticated order in the upper story is graceful and original.

The building was intended to be of brick faced with Dunhouse stone. The architect's estimated cost for it was 29,955/.

DESIGN FOR TECHNICAL INSTITUTE, LEYTON.

The drawing of this design, by Mr. F. H. Tulloch, was exhibited at the last Royal Academy Exhibition, and from the "Royal Academy Catalogue" we took the title on the plate, "New Public Offices and Technical Institute, Leyton." It was only after the lithograph was nearly printed off that we learned from the architect that this was a competition design only, not carried out. Had we known this sooner, we should of course have put the title on the plate so as to convey the fact, though the question does not affect the interest of the design in itself. We may say that this is not the first time that we have known of mistakes and misapprehensions arising from a drawing which was in fact a competition design only, being sent to the Academy with a title conveying the idea that it represented the building that was being, or was to be, carried out. It would be much better to avoid this, and to send a drawing in as "competition design" when that is its real status; otherwise mistakes occur, and the actual selected architect may have reason to complain.

We subjoin the plan of the building as intended by the architect, which sufficiently explains the design.

ROTHERHAM TOWN HALL.

THE most important feature of this competition was to provide the accommodation required by the conditions for the limited sum of 15,000/. The sizes of the offices were left to the discretion of the competitors, and the selected design provides, in every department, the requisite space for the convenient and efficient transaction of the business in this parish, as well as a Public Hall of sufficient area for public assemblies.

The administrative part of the building is kept quite distinct from the Public Hall, as the former will be in daily use, whereas the occupation of the latter will only be occasional. This permits of considerable economy in the working of the building, and allows the public hall to be placed on the ground floor, so as to obtain ample and convenient exits.

The Vestry Hall is placed on the first floor, facing Lower-road, and the Committee-room (also to be used as a Coroner's Court), cloak, waiting, and retiring-rooms are adjacent.

The corridors and vestibules are to have mosaic paving, and fireproof floors are provided to the offices.

The entrance from Neptune-street gives access for the public to the Coroner's Court on first floor and to the public gallery to Vestry Hall. It is also for the use of the caretaker, whose apartments are placed on the second floor.

The main façades are to be faced with red bricks and Portland stone, and the roofs covered with green slates.

Special attention has been given to the lighting, heating, and ventilation of the building, the heating being upon the low-pressure hot water system with radiators.

The lights of the adjoining owners have been respected, and the London County Council requirements have been fully satisfied.

The Vestry propose to omit the corridor shown round three sides of the Public Hall in order to give more seating accommodation, and they have obtained permission for an advanced line of frontage in Moodkee-street, thus enabling the design of this front to be considerably improved.

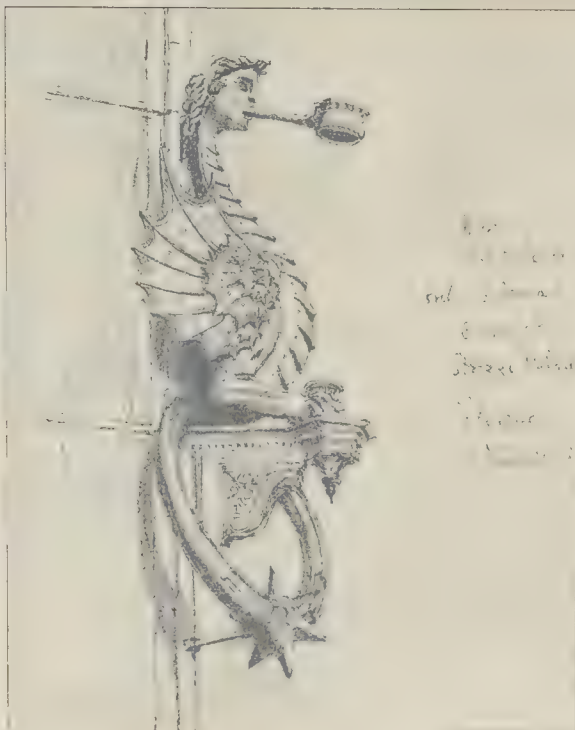
The elevations are the natural expression of the plans, and no sacrifice of internal convenience or economy has been made for the sake of exterior effect.

MURRAY & FOSTER.

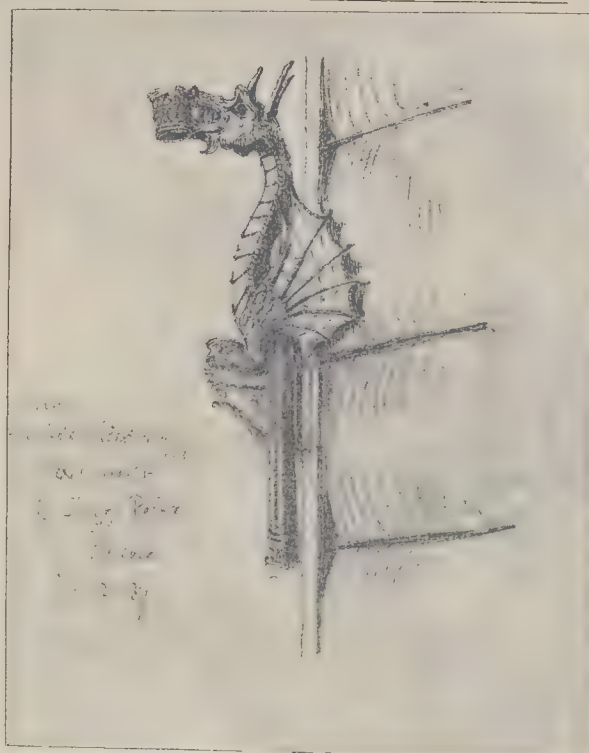
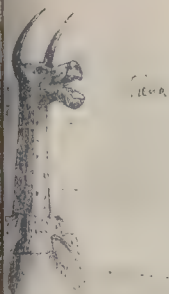
SKETCHES FROM FLORENCE, SIENA, AND VENICE.

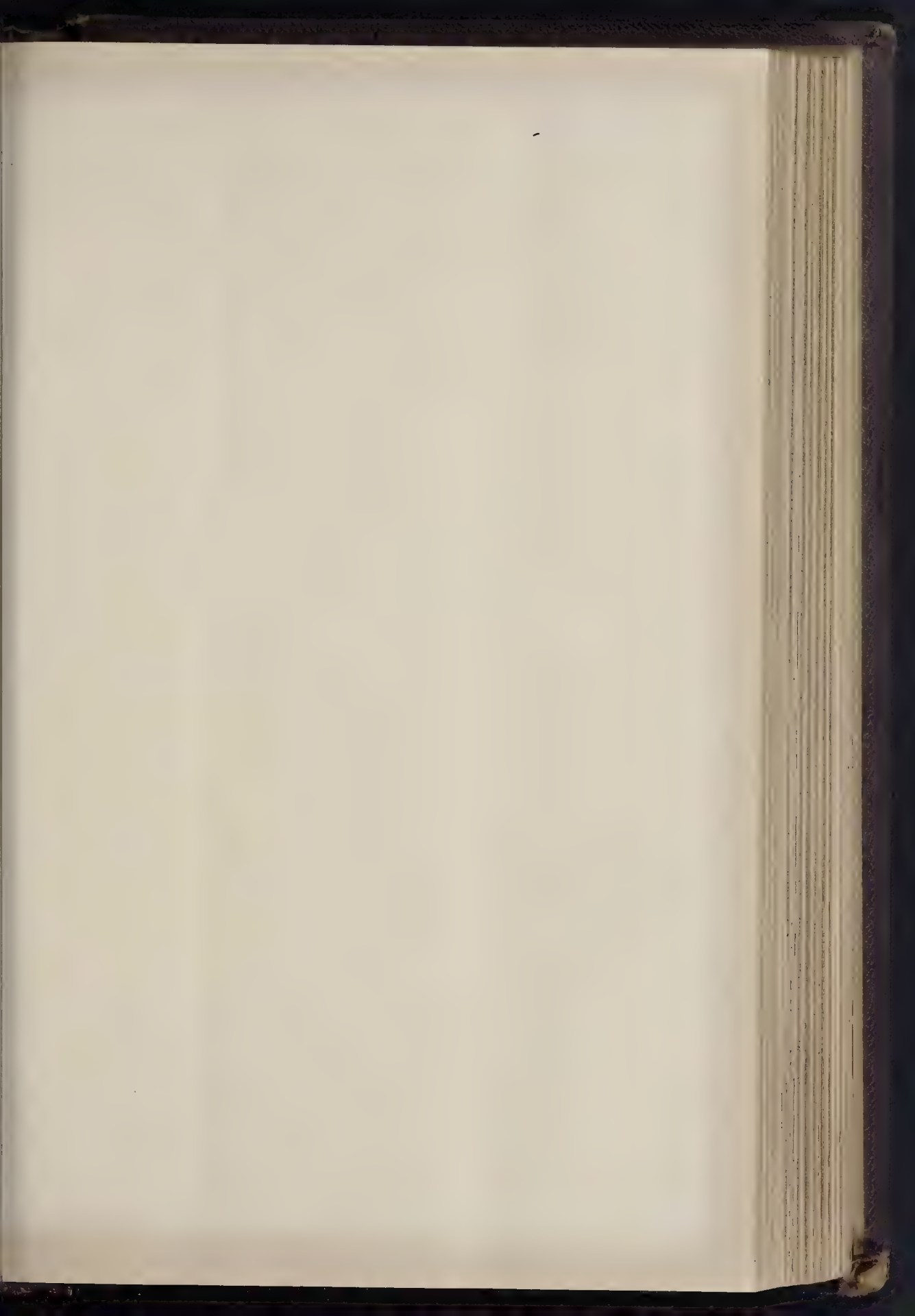
THE two flag or torch holders (surmounted by lamps, not shown), are on the corners of the "Via Tornabuoni" front of the Strozzi Palace, and are considered fine examples of the ironwork of the period (they are supposed to be by Caparra, 16th. cent.). That in the centre is of a lighter design, as befitted its position, which is clasping a single column standing apparently as a monument at a "cross roads" in Siena. The mosaics are in the North porch of St. Mark's, and afford a good example of the difference in treatment of design when large or small tesserae are used.

ARTHUR C. BLOMFELD.



Andelher in Piazza di
Postola - Siena
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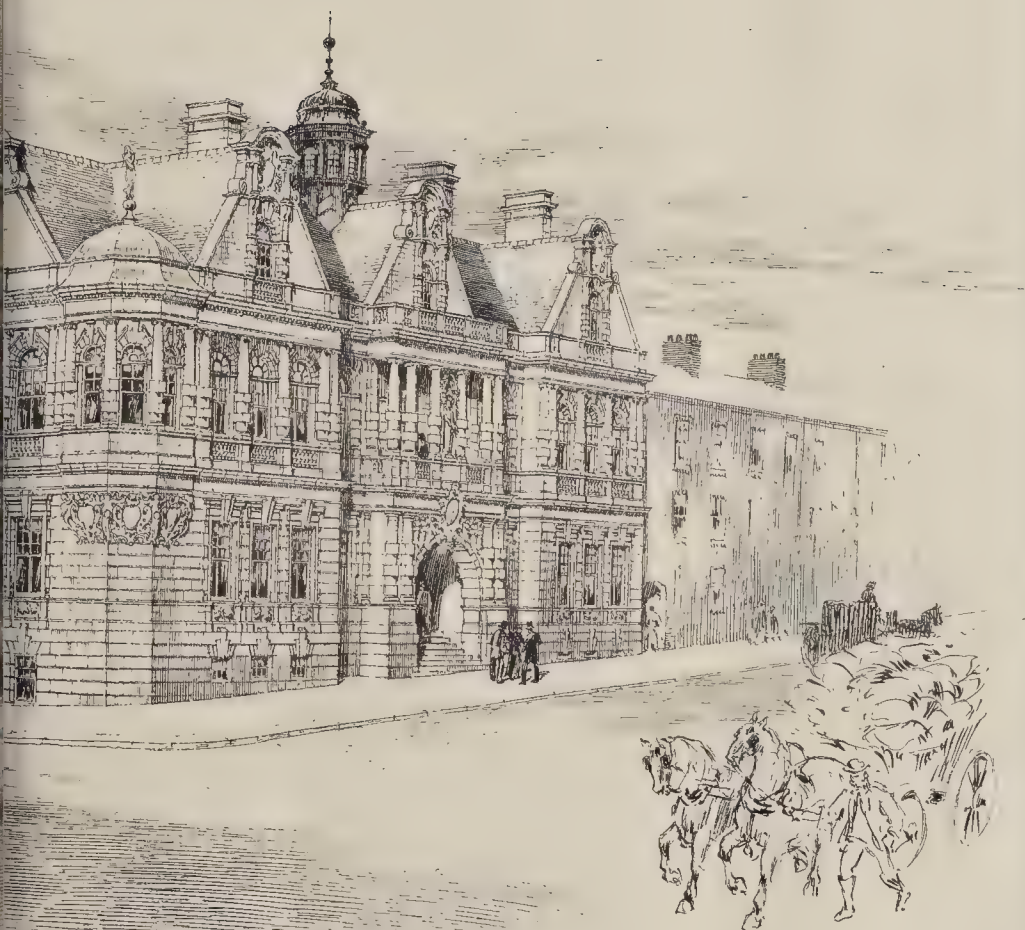
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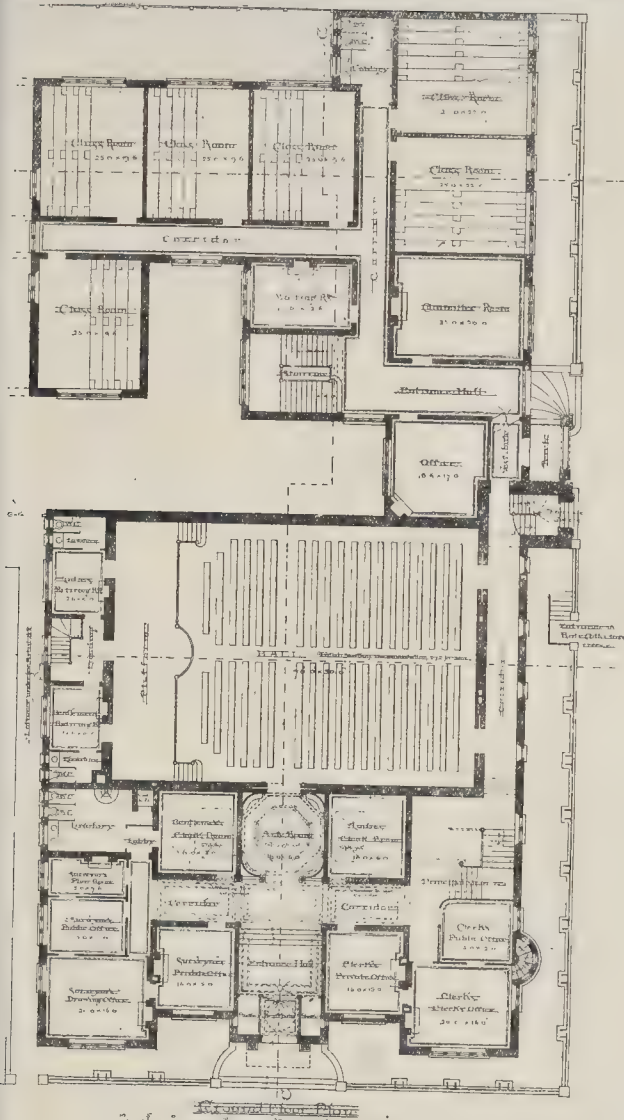


STON MUNICIPAL BUILDINGS

PERSPECTIVE VIEW

By MR R A BRIGGS FRIBA.





Plan of Design for Technical Institute, Lytton.

THE LONDON COUNTY COUNCIL.

The first meeting of the newly-elected County Council was held in the County Hall, Spring Gardens, on Tuesday.

Election of Officers.—The time of the meeting was mainly given up to the election of officers. After considerable debate, Mr. Arthur Arnold was elected chairman, Mr. Williams Benn, M.P., vice-chairman, and Mr. W. H. Dickinson, deputy-chairman.

New Fire Brigade Station at Fulham.—The report of the Fire Brigade Committee contained the following paragraph:—

"Last June the Council resolved to erect, without intervention of a contractor, a new station in place of the existing fire-engine station at Fulham, the cost of the work being then estimated by the Council at 10,500l., and on June 26 the Works Committee reported that it was satisfied with the estimate, and was taking the necessary steps to carry out the work. Owing to circumstances which we have fully explained in previous reports it has not been practicable until now to commence the work, and the price of materials having in

the meantime increased, the Works Committee suggests that the estimate needs revision. We have consulted the architect, and he reports that if he were now making an estimate upon the drawings and specification sent to the Works Committee last year his figures would be increased by 500l. He also asks that, as the building is to be erected a few feet back from the line originally proposed, a sum of 400l. may be added to cover the cost of fencing in a strip of additional ground which has been acquired, and which he suggests might be excavated with a view to the better lighting of the basement. The revised estimate of the cost of the station is therefore 11,400l., and we recommend—

"That the revised estimate be referred to the Works Committee."

The Council adjourned soon after 7 o'clock.

ARCHAEOLOGICAL SOCIETIES.

BRITISH ARCHAEOLOGICAL ASSOCIATION.—On the 6th inst. a meeting of this Association was held, Mr. E. P. Loftus Brock, F.S.A., in the chair. The Rev. Case Browne, M.A., exhibited a rubbing of a brass monument to the memory of Thos. Hendley and his wives in Offham Church, Kent. It is fixed to a wall, and is remarkable

for having no dates filled in of the interments of any of the persons whom it commemorates. It was, doubtless, erected in their lifetime. Various photographs of the church were also exhibited. The first paper was on "The Church and Manor of Offham," by the Rev. Case Browne. The name is recorded in many ancient documents with several variations. Its early connexion with a Saxon king is probable, not only from the name but from the fact that Offham was a royal manor at the Conquest. The church, which has been once much restored, preserves some traces of ancient masonry, and its plan indicates various changes from the simple nave and aisles of its form in Norman times. There is curious reference in a will to a brass erected by a widow to the memory of her son, John Revell, 1534, in which she enjoins that the figure is to be as nearly as possible like her son, showing, as has not unfrequently been supposed was the case, that effort was actually made in these memorials to create a likeness to the person represented. A second paper by Dr. Russell Forbes, of Rome, on "The Ancient Gates of the Church of Sta. Sabina, Rome," was read by Mr. W. de Gray Birch, F.S.A., in the author's absence. The gates are of remote antiquity, and their appearance justifies the belief that they date from the middle of the fifth century. The material is cypress and cedar. The setting of the panels in a framework of vine leaves is of much later date, and in the resetting the panels have probably become disarranged. They are carved with subjects taken from the Old and New Testaments, the Crucifixion, the two Marys at the Sepulchre, the Adoration of the Magi, Christ and the Woman of Canaan, Christ receiving Sta. Sabina, the water being turned into wine, the Ascension, and Elijah in his chariot, being amongst the subjects represented. The panels are of value, apart from their actual style and workmanship, from their being such early examples of the mode of representing Biblical subjects. The paper was illustrated by admirable photographs of these little-known works of art.

SOCIETY OF ANTIQUARIES OF SCOTLAND.—The usual monthly meeting of the Society of Antiquaries of Scotland was held on the 11th inst., the Hon. Hew Dalrymple in the chair. The first paper, on "The Monumental Effigies of Scotland from thirteenth to fifteenth century," by Mr. Robert Brydall, F.S.A.Scot., St. George's Art School, Glasgow, was illustrated by a series of drawings by the author. The custom of carving monumental effigies in full relief, he said, did not appear to have prevailed in Scotland until the thirteenth century, the incised slab, and a peculiar treatment of the figure in flat relief, having been the previous monumental forms. While it was on record that certain tombs or effigies such as those of The Bruce and Robert II., were sculptured on the Continent and in England, the greatest number were executed in Scotland. The destruction and dilapidation of these splendid works of art in Scotland was scarcely conceivable until the list was reckoned up. If they excepted the mutilated coffin-lid of William the Lion at Arbroath, the effigy known as Marjory Bruce, at Paisley, and the unidentified Stewart of Bute, at Rothsay, they had no royal effigies left in Scotland. Of those of church dignitaries, most had disappeared, while of those that remained none had escaped mutilation or decay. Even the knightly effigies, of which more examples had been preserved, were for the most part in much the same sad state. In strong contrast to the English effigies, with their beautifully enamelled heraldry and metal figures, the Scottish effigies, with the exception of two or three in marble, were of ordinary stone, and the only suggestion of the use of other material was in the hollows for the face and hands in the fine incised slab at Creich, also in contrast with England. There was no doubt that many of the Scottish effigied tombs were coloured and gilt; and worn, defaced, and mutilated as they were, their study was still full of interest to the artist, the antiquary, and the historian. Mr. Ross, architect, and Mr. Balfour Paul, Lyon King of Arms, made some remarks on the interest of these Scottish monuments, and the desirability of a complete description of every example being obtained as speedily as possible. In the second paper, Dr. Joseph Anderson gave an account of the cave recently discovered at Oban, which had been explored, under the auspices of the Society, by a local committee. In the third paper, Mr. D. P. Menzies, F.S.A.Scot., described the 'bagpipes' preserved in the family of pipers associated with the chiefs of Menzies. The last paper was a description, by Mr. H. F. Morland Simpson, of

a Rune staff of Swedish origin, presented to the museum by the Hon. John Abercromby.

Correspondence.

To the Editor of THE BUILDER.

THE TRADE UNIONS AND THE EDUCATION CONFERENCE.

SIR,—I am sure that there is not one of your readers who will not view with considerable regret the occurrence at the last meeting of the Education Conference, which threatens to seriously interfere with its future work and power for good. I therefore crave your permission to define the present position as clearly as I am able, because it seems to me that the difficulty is largely caused by an imperfect comprehension of the points at issue, and may, after a little explanation and reflection, disappear.

It should be quite clear that the workmen's societies were not invited to attend the Conference in their Trade Union or political capacity, any more than the builders' societies or the architects' societies. They were all invited simply as societies of men engaged in particular branches of the building industry of London, whose practical knowledge of the particular difficulties under which their members laboured would be of great service to the Conference. The ideal method would no doubt have been for each of the trades to have appointed representatives by vote, quite irrespective of societies of any kind.

This was, however, a plan involving great practical difficulties, and indeed, almost impossible. It was therefore determined to do the next best thing, and to ask the principal societies that had been established by the men in the various trades to elect delegates. In this case the machinery for election was ready to hand, and although the electorate was hardly as comprehensive as it would have been had the former alternative been chosen, the practical advantages of dealing with established organisations were sufficient to outweigh the disadvantage of a limited electorate. The societies were, in fact, asked because they represented an assemblage of men who were engaged in the practice of a particular branch of the building industry. It was only an accident that they happened to be Trades Unions, and it cannot be made too clear that the political side of their activity had nothing whatever to do with this invitation. It could not possibly have had, because the Conference itself was essentially on non-political lines. Its object was to find out whether a combined effort could not be made to raise the standard of workmanship throughout the building industry. This seemed to be a common ground of agreement where all might meet on perfectly equal, friendly terms. The question affected the architects as much as the master-builders and the workmen, the supporters of examinations as much as their opposers, the Trade Unionists as much as the Non-Unionists. It was therefore gratifying to find the invitations accepted in the same generous spirit in which they were issued. To make this position doubly clear a self-binding resolution of a stringent nature was unanimously adopted by the Conference at its first meeting, which placed entirely out of the question any attempt to introduce politics of any sort.

The Trade Union delegates who withdrew on Friday because of the presence of a delegate from the Free Labour Association, evidently did so with great reluctance; but their instructions were absolute, and they had no alternative. But they will no doubt fully report their action to the various Executives, who will have to decide as to their future attitude, and I cannot yet believe that these Executives, when the whole bearing of the case is placed fairly and squarely before them, will hesitate to authorise their representatives to continue to attend the Conference. It is scarcely credible, in these days of free and open discussion, that any considerable body of men would willingly consent to wreck a Conference whose sole aim is to advance the position of the great art of building. It is not as if the men themselves were lukewarm on the subject. I can testify to many of them being very keen, and desirous to do their work creditably, and to carry out the architect's designs in a loyal and thorough manner. No one knows better than the Trade Societies what an amount of work there is for this Conference to do. Are they, therefore, going to retire simply because of the presence of one delegate from one Society whom they conceive to be distasteful? Surely the members of this Society have led of their own to educate and send out into the world, and it would not have been a very English action for the Architectural Association to have refused to invite this Society, on account of their political views, which have nothing whatever to do with the subjects under discussion by the Conference.

Whichever way the situation is looked at, there seems to be no sufficient reason for the withdrawal of the Trade Societies. Mr. Verdon's speech was evidently intended to prove that the Free Labour Association did not consist of practical workmen, but if this be the case, are not the architects going to find it out for themselves? Will he not even give the architects credit for sufficient shrewdness and knowledge to be able to tell men who know what

they are talking about from those who do not? This Conference will have to deal with many questions of intricate detail, and from the Trade Union's own point of view, I suggest that it would be more judicious to let the architects form their own opinion of the relative capabilities of the delegates, than to prejudice the whole case by this early withdrawal on a matter that has nothing whatever to do with the Conference.

I would therefore venture to appeal to the Trade Union executives to give this question their very earnest consideration. It is not a matter that can be lightly dealt with, because if the advances of the architects are to be slighted in this instance, it may be some time before they are renewed, and the two classes, whose interests are so closely identified, will drift further and further apart, to the detriment of their common good. It is indeed a very grave responsibility, and the decision appears now to lie wholly with the Trade Union executives.

OWEN FLEMING.

CREWE SANATORIUM COMPETITION.

SIR,—Until I saw Mr. Granger's letter in your last issue I was not aware that he had placed my design first, as I had been officially informed that Mr. Bolshaw had been awarded the 1st premium and Mr. Payne the 2nd. It seems very clear that either a mistake has been made, or owing to Mr. Bolshaw's motto being the same as mine or there has been a serious injustice in passing over the deliberately-arrived-at judgment of the assessor as set forth so definitely in his report which you publish. If I may be allowed to say so, I consider that Mr. Granger has acted in a public-spirited way in resigning another appointment in consequence of the unsatisfactory result of this competition, and also in publishing his report, but for which we should have been ignorant of the real facts of the case.

I enclose extracts from the advertisement and instructions issued by the Corporation, so that you may judge of the matter, and would call particular attention to the advertisement which refers to the design "adjudged best," and adds the name of the assessor.

HAMPDEN W. PRATT.

SIR,—As author of design submitted under motto "Red Maltese Cross in Circle," the design mentioned in your last issue as one of the best sent in, allow me to point out that no mention of fire-extension was made in the conditions issued to competitors, and only after the point had been raised by an intending competitor did we receive word that future extension was not unlikely.

Even had it been made a condition, I would have shown the extension encroaching upon the adjoining land, for, as you point out, the present site is only large enough for the accommodation now required.

Another point raised by the assessor, viz., that one design suffered through not having provided a separate laundry for staff seems to indicate his want of practical knowledge. For a hospital of this size no special staff laundry is required, and it is only an additional cost in erecting and working.

Mr. Granger's letter clears him of the charge of complicity in this last and worst municipal job, although his judgment and that of Dr. Jones appear to have been seriously at fault.

W. G. WILSON, A.R.I.B.A.

The Student's Column.

BRICKS AND TERRA-COTTA.—XI.

THE COLOURING OF BRICKS.

THE production of a uniform tint in the better class of building bricks has for years exercised the ingenuity of leading makers, and whilst some are able to turn out materials of any desired tint within certain limits, others fail conspicuously in that respect, their circulars to the contrary notwithstanding. The causes of failure are not far to seek; they are primarily the result of non-appreciation of the actual chemical and mineralogical nature of the earths employed, and secondly, utter inability to control the temperature at which the bricks are burned. Of course, more incompetent makers still, neglect the necessary preparation of the raw earths, and quite a large number (even with a pretence of knowledge) understand so little the actual character of the raw material they use in tens of thousands of tons, that it is a wonder they are able to produce anything of marketable value. It is not too much to say that the majority of manufacturers add certain ingredients to produce certain colours from having ascertained, by a sort of side wind, what their successful neighbours are doing. So it is that many extremely elementary scientific problems are introduced to the visitor as "trade secrets."

In the colouring of bricks, as much depends on the method of burning as in the composition of the earths after preparation. Anyone with moderate care could produce red bricks, say, from an earth containing much iron; but it requires a

different kind of skill to always burn that earth in such a manner as to ensure a whole kiln-full being of the same tint as another kiln-full burnt a few weeks previously. There is nothing much more annoying to an architect of a large brick building than to notice a difference, however subtle, in the tint of bricks delivered on the job during the progress of the building from first to last. They may be thoroughly sound bricks, and excellent in every other respect, but that the colour is uncertain is sufficient to condemn them in most architects' eyes. Slight differences in tint in large blocks of stone may be tolerated, and even regarded as desirable for certain work; but with bricks and terra-cotta, especially the former, the case is not the same. The result is that the makers in many districts, finding they cannot produce uniform tint with the means at their disposal, are, perforce, compelled to do a second-rate trade.

We regret to say, however, that the faculty of being enabled to produce a certain desired tint and a fine-grained brick has so far impressed itself on the minds of some manufacturers as to lead to neglect in other directions connected more particularly with the weather-resisting properties of the material. No process of colouration is to be commended which, in the end, tends to the decay of the bricks; and it is well to bear in mind that the colour produced should last longer than the time occupied in putting up and finishing the building.

Further, and this is a point that has received practically no consideration hitherto, it is desirable that the class of mortar used should be suited to the composition of the brick, or rather vice versa. It is generally believed that fairly good mortar undergoes very little change after being put into the wall; although we have no intention at the present moment of going into the subject of mortars, it may be pointed out that this is not always the case, and that unsightly streaks produced in bricks are not unfrequently due to the effects of chemical solution derived from the mortar. We are far from saying that many good bricks are affected in this manner, and we must confess that on a casual inspection we believed the markings to be altogether due to runlets of rain water down the face of the building between the joints, as it were.

On a closer examination, and as the result of experiment, we are convinced that whilst the effects produced may in a few instances be due to the mere action of the weather, spread over a number of years, in the majority they arise from the composition of the mortar, which is attacked by rain and provides material for a solution which tends to blanch red bricks. Another point to which we may call attention is the prevalent use of iron railings, balconies, ornaments, and the like outside buildings, which, when not properly fixed to brick walls, and not well looked after when put up, frequently stain bricks a rusty brown colour. It is, perhaps, well nigh impossible to effectually control this matter, which lies for the most part outside the province of the architect; but something, at any rate, could be done to mitigate the evil in the first place by proper construction and painting.

We know of many solutions to prevent the oxidation of iron, upon which, however, we would rather not express an opinion.

The other day we were much amused to observe the elaborate attempts of a suburban architect to prevent this staining of a brick front of a not altogether unpretentious building. He fixed a piece of galvanised iron in the form of an arch over the point of junction between the iron balcony and the wall, to shield it from the inclement weather. A little lower down was a hideous carving in Aberdeen granite, which explained matters. It was not so much the brickwork that was to be protected as this precious specimen of workmanship. But he was not so particular in the matter of the quality of the "compo," however, as he might have been, with the result that a series of bead-like rusty stainings have formed therefrom on the brickwork, which extend to the carving in question. And who shall say that they are not improving its appearance? This is somewhat akin to the modern use of "gorgons' heads" at the ends of gutters discharging rain-water from the roof.

Turning now to the general consideration of colouring bricks it may be said that the colour of the earth of which they are made is no guide whatever to the tint assumed after burning. In brickmakers' parlance a red clay is one that produces a red tint, white clay a white tint, and so on; the raw earths may neither be red nor white. Colour depends, in a great measure, on the proportion of hydrated oxide of iron in the clay; if iron is present in clay containing no lime, or similar substance, the colour produced at a



NEW PUBLIC OFFICES AND TECHNICAL IN



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ON—MR F H TULLOCH, A.R.I.B.A., ARCHITECT

Perier. On one face is a portrait of the ex-President, on the other a woman in antique drapery and covered with a veil, as if mourning, symbolises France, placing a vote in an urn at the foot of the column. M. Chaplain has now received a commission to execute a medal in commemoration of the accession of M. Faure. It will be curious to see if the presidency will again have changed before the commemorative medal of the existing President has been completed.

—An architect, M. Galignon, has proposed to the general committee of the 1900 Exhibition the construction of a celestial sphere fifty metres in diameter, and terminating by a "gare maritime" at Bayonne, on the left bank of the Adour.—There is talk of constructing around the town of Epinal (Vosges) a fortification wall on the modern system.

—Ten sculptors took part in the competition for a monument to be erected in the town of Epinal. The models for these are now on view in Paris, in a room in the mairie of the 14th Arrondissement.—The ancient palace of the Popes at Avignon has been for a long time in use as a barrack, and in the process of this use the fine paintings and sculpture which it contains have suffered much injury. A committee of artists and archaeologists has been formed in order to raise a sum to build a barrack elsewhere and offer it to the Government on condition of the latter vacating the papal palace, which would then be "restored" to be framed into a museum.

—The death is announced of M. Victor Vaissière, a former engineer of the Ponts et Chaussées department, and who was one of the most zealous collaborators of Baron Haussmann in the work of the transformation of Paris.—The death is announced also of two artists of great talent, of whom we need speak more at length on another occasion.—M. Charles Delort and M. Armand Dumaresq—the first a painter of *genre*, the second of military subjects.

MISCELLANEOUS.

PARTNERSHIP.—Messrs. Macer & Fitzwilliam, surveyors and land agents (London), have taken into partnership Mr. West, formerly Assistant Surveyor to the Hackney District Board of Works. The new style of the firm will be Macer, West, & Fitzwilliam.

A GRANITE PULPIT.—At the Aberdeen Granite Works there has been constructed, after the design of Mr. A. Marshall Mackenzie, A.R.S.A., a pulpit to be placed in the new church at Crabtree, near Balmoral. The foundation-stone of the new church, for which Mr. Mackenzie is architect, was laid by the Queen last September. The pulpit, which will be placed opposite the Royal pew, has five sides, and is made of fourteen different kinds of granite, giving plenty variety of colour. There is a chamfered base, 2 ft. 6 in. high, with a die above, both of fine-axed Inver granite. At each of the six corners are clustered columns—three in a group, or eighteen in all—of polished granite, with carved capitals. The granites used are Broomore, Hill of Fare, Rubislaw, Petherhead, Mull, Cairngull, Corrennie, Ben Cruachan, Abriachan, Dalmore, Dyce, Kintestary, and Glen Tana (the latter being really a porphyry). Between these shafts are panels, with raised centres, faceted and polished, in various granites. There is a moulded cornice in fine-axed Kenney granite, and under it will be placed a series of pebbles, collected by Princess Louise on the Island of Iona, and which have been beautifully polished. The pulpit, which has a reading-desk, is 5½ in. high, and will be lined with wood.

VENETIAN BLINDS.—Messrs. Tidmarsh & Sons sends us a description of some of their special provisions for insuring the good working of venetian blinds, among other things a guard over the pulley frame to prevent the cords jumping off the pulleys, a not very uncommon accident.

A PROTECTION BELT FOR WINDOW-CLEANERS.—Mr. F. O. Ferguson, of Ilfracombe, has patented a belt which is to go round the waist of a person seated on the window-sill to clean the outside of a window, with side straps to be attached to a strong iron hook or staple in the jamb of the window opening. Until we get all sash windows made reversible a contrivance like this may be useful in preventing accidents.

THE INSTITUTION OF CIVIL ENGINEERS.—At the ordinary meeting of this Institution, on Tuesday, Sir Douglas Fox, Vice-President, in the Chair, the first paper read was on "The Kidderpur Docks, Calcutta," by Mr. W. Duff Bruce, M.Inst. C.E. Within the limits of the Port of Calcutta the river Hooghly varied in width from 1,300 to 2,000 feet. From March to July, when strong winds prevailed, the current at spring tides attained a velocity of from five to six miles an hour, and during the rainy season the water carried a large quantity of mud in

suspension. The city was about ninety miles from the sea, and the tidal range between low water of spring tides in the dry season and the average high water in the rainy season was about 18 ft., and during floods as much as 22½ ft. The Kidderpur docks consisted of a 60-ft. lock and an 80-ft. entrance from the river to a basin 600 ft. by 680 ft., with a double entrance of 60 ft. and 80 ft. leading from the basin into a dock 2,600 ft. long and 600 ft. wide for the greater part of its length, the area of the dock being 3¼ acres. Two graving-docks, one 520 ft. and the other 350 ft. long, had also been made on the east side of the basin. An important feature of the design was the construction of a canal and boat dock from Tolly's Nullah to the Southern end of the docks for the supply of clear water. Water was admitted from the nullah to the canal, which was 3,300 yards in length at high tide, and was allowed to flow into the canal until its level attained that of high water. The sluices were then closed, and the flow of the water through the canal being very slow, the water which it contained on entering the sluices was deposited before reaching the pumping-station. There the water was raised by centrifugal pumps to a maximum height of eleven feet, and discharged into a canal connected to the south end of the lock. The object of this arrangement was to prevent the inflow, through the entrances, of water highly charged with mud, to ensure the frequent change of water in the docks and to allow of the foundations of the walls being kept as high as possible. The pumps provided were capable of raising 256,000 cubic feet of water per hour through a height of ten feet, and were worked as required to maintain a higher level of water than in the river. The docks were equipped with fifty-six movable hydraulic cranes, fifty being constructed to lift 35 cwt., and six to lift loads up to five tons. These cranes had a radius of 35 ft. and overhung the quay 29 ft. Pressure for working the cranes, lock-gates, capstans, and swing-bridges was provided by hydraulic engines situated near the sides of the dock. The engines (two pairs) were each of 230 i.h.p. The pressure in the mains was 700 lbs. per square in. In addition to the cranes, sheers, worked by steam-power and capable of lifting 100 tons, had been erected on the east wall of the dock. Cargo-sheds, 300 ft. long and 120 ft. wide, had been erected on both sides of the dock. The total shed-area provided being 432,000 square ft. About twenty-eight miles of railway lines had been laid to the 5 ft. 6-in. gauge, for working the traffic of the docks. The quays and sheds were lighted by arc and glow-lamps. The dock and basin walls, the design of which led to much discussion, were 35 ft. wide at the base, and were built with voids filled up with broken bricks and dry earth, and had a subway near the top for the accommodation of hydraulic and other mains. The walls were of sufficient width at the top to entirely carry the cranes. Owing to the treacherous nature of the ground, it was found impossible to excavate trenches for the full width of the walls; the ground was therefore only taken out for half the width at one time, and when the brick-work was built in the excavated portion up to the level of the dock bottom, the second half of the trench was opened and the wall was then completed to its full width. In the second paper, "Note on the movement of the walls of the Kidderpur Docks," by Mr. J. H. Apjohn, M.A., M.Inst. C.E., an account was given of movements which had taken place early in October, 1890, in the eastern and south-western walls of Dock No. 1.

ARCHITECTURAL AND BUILDING TRADES CLASSES, REGENT-STREET POLYTECHNIC.—The distribution of the prizes won by the students of the architectural and building trades' classes of the Polytechnic took place on Tuesday in the hall of the Institute, Regent-street. Three hundred and fifty prizes and certificates have been gained by the students at the Science and Art, City Guilds, and the institute examinations. Mr. F. V. Baars obtained the national competition prize for works, and Mr. J. M. Plasterers' Company's prize of £8, and honours, and first certificate City and Guilds of London for plastering. Mr. G. A. Mitchell also distinguished himself in building construction and plastering, obtaining the City and Guilds special bronze medal for the latter, the Plasterers' Company's prize, and a special silver medal for building construction; while Mr. G. H. Stanley has won a free studentship, value 115s. yearly, tenable for three years at the Royal College of Science, South Kensington. After a brief statement from Mr. Robert Mitchell, the director of education, Mr. W. C. Steadman, M.P., buted the prizes, at the conclusion of which Mr. Mitchell moved a vote of thanks to Mr. Steadman, who briefly replied.

WILL OF MR. E. G. PALEY, F.R.I.B.A.—Probate was granted on the 11th inst. of the will of the late Mr. Edward Graham Paley, F.R.I.B.A., Lancaster (of the firm of Paley, Austin, & Paley), who died on January 23, 1895. The net value of the estate is set down at 71,999s. 15s. 4d. The testator bequeaths the whole of his household effects, plate, and other articles of value, horses, carriages, stables, &c., for the use of his wife, together with the residence at the Greaves, Lancaster, these, upon her decease, to devolve upon his daughters, Frances Emily and Mary Elizabeth. To his only son, Mr. H. A. Paley,

a partner in the firm, he bequeaths the whole of his office property and effects, books, and instruments. The residue of the estate is placed in trust, from which the widow of deceased testator is to derive £500 per year, and his five children are to have equal yearly benefits from the remainder. He bequeaths 100s. each to his grand-children; and 100s. to a god-daughter; and 100s. is left at the discretionary disposal of the Lancaster Charity Trustees. Excepting the latter the bequests are of a private nature. Two annuities of the aggregate value of 2,500s., each in the Phoenix Foundry, Lancaster, are bequeathed to his wife, to revert upon her death to his daughter, the wife of Mr. Francis Sharpe, principal proprietor of that foundry.

LEGAL.

CASE UNDER THE NEW BUILDING ACT.

At Bow-street Police-court on the 11th inst., Mr. Frederick Wallen, District Surveyor for the parish of St. Pancras West, appeared before Sir John Bridge to two summonses calling upon him to show cause why a decision he had arrived at with regard to the proposals of Messrs. Shoobred to erect new buildings on a site at the corner of the Court-road and Grafton-street adjoining their premises, should not be reversed. Mr. J. P. Grain, and Lord R. Cecil appeared for Messrs. Shoobred. Mr. Wallen had reported that the plans for the new buildings, submitted by Messrs. Shoobred, were in some respects in contravention of the new Act, and at the last hearing Mr. Grain argued that they complied with the Act in every essential particular.

Mr. Grain assumed his argument, and mentioned that when the plans were first sent in Messrs. Shoobred contemplated having something like a hundred sleeping apartments for their employees; but, on the suggestion of Mr. Wallen, that part of the plan was altered. No doubt Mr. Wallen was doing what he conceived to be his duty; but Mr. Grain suggested that in this instance he was labouring under a mistake in alleging, as he had done, that the proposed buildings were of the warehouse class. The plans had been drawn by Mr. H. E. Hovenden, architect. The proposed buildings were of a domestic class, and would, therefore, be treated differently to warehouse buildings.

The defendant said he was willing to waive and withdraw his notice as to the buildings being of the warehouse class. He would admit that they were, under the Act, domestic buildings; but he contended that under Section 41 of the Act, sufficient air space was not provided.

Sir J. Bridge asked the defendant if he understood the Section. There was no reply until Lord R. Cecil said no one understood it when it was passed.

Sir J. Bridge read a Section dealing with diagonals, horizontal lines, and a reference to 63½ degrees, and said it was perfectly unintelligible.

Defendant: That refers to the plane of the line, Sir John.

Sir J. Bridge: I am glad there is something plain about it.

Defendant remarked that, if Mr. Grain's contention were correct, all the back yards in London might be covered with houses.

Lord R. Cecil said he could not trouble the Court with diagonal or horizontal lines. The main question was whether Messrs. Shoobred were bound to have an air space 10 ft. broad running through the whole length of these buildings. He contended the Sub-Clause of Section 41 of the Act, upon which Mr. Wallen relied, did not apply, and that Messrs. Shoobred would be perfectly justified in erecting buildings upon the plans put in.

Mr. F. T. Shoobred, senior partner in the firm, produced plans of the proposed buildings prepared by Mr. Hovenden.

Defendant submitted that the majority of the rooms were habitable rooms within the meaning of the Act.

Sir J. Bridge said he was glad he was not bound to determine this case on the construction of any of the Sections of the Act that had been quoted, because almost all the Sections of the Act seemed to him to be so drawn as to be perfectly unintelligible. Where intelligible, they were intelligible in the situations. There was one point which was a matter of fact. He found, as a matter of fact, that the buildings were to be used principally as offices, counting-houses, and made an order setting aside the objections of Mr. Wallen as to Section 41, the other objection being withdrawn.

MEETINGS.

FRIDAY, MARCH 15.

Architectural Association.—Mr. J. W. Singer on "Iron and Brass," 7.30 p.m.

Royal Institution.—Professor Roberts-Austen on "The Rarer Metals and their Alloys," 7 p.m.

Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—Professor A. Bostock Hill on "Tran Nuisances," 8 p.m.

SATURDAY, MARCH 16.

Architectural Association.—Visit to the Chelsea Town Hall, Polytechnic, and Free Library.

St. Paul's Ecclesiastical Society.—Visit to Sir John Soane's Museum, No. 13, Lincoln's Inn Fields, under the guidance of Mr. George H. Birch, F.S.A., at 5.30 p.m.

Sanitary Institute (Lectures and Demonstrations for Sanitary Officers)—Inspection at the Aylesbury Dairy Company's Premises. 8 p.m.
Edinburgh Architectural Association.—Visit to Aberdeen House.
Queen's College, Cork.—Mr. Arthur Hill on the History of Architecture. 8 p.m.
Junior Engineering Society.—Visit to the Midland Railway's Goods Station and Depot and Repairing Shops, St. Pancras. 3 p.m.

SUNDAY, MARCH 17.

South Place Institute.—Miss Frances Hicks on Factory and Workshop Inspection. 4 p.m.

MONDAY, MARCH 18.

Surveyor's Institution.—Mr. E. M. Leman on "Agricultural Credit Banks." 8 p.m.
Victoria Institute.—4.30 p.m.
Architectural Section, Glasgow Philosophical Society.—Mr. Lewis R. Crosskey on "Industrial Art, with special reference to the training of Artisans." 8 p.m.
Business Meeting. 8 p.m.

TUESDAY, MARCH 19.

Institution of Civil Engineers.—Papers to be further discussed:—(1), by Mr. William Duff Bruce on "The Harp Docks, Calcutta." (2), by Mr. James Henry Johnson, entitled "Note on the Movement of the Walls of Retaining Works." (3) Paper to be read, time permitting: "Steam-Engine Economy; Condensing Engines, by Mr. Henry Davey. 8 p.m.
Society of Arts (Applied Art Section).—Mr. Alexander Hall on "Decorative Designing." 8 p.m.
Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—Professor A. Wynter Blythe on Diseases of Animals in Relation to Meat Supply; Characteristics of Vegetables, &c., unfit for Food. 8 p.m.
Glasgow Architectural Association.—Smoking Concert.

WEDNESDAY, MARCH 20.

Carpenters' Company (Free Lectures on Matters Connected with Building).—Mr. J. D. Crane on "Coloured Glass in Windows." 8 p.m.
Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—Inspection and demonstration of the London Waterworks, Lake Bridge.
Ordinary meeting of the members of the Institution.
Caricature Association, Engineering, and Surveying Association.—Mr. H. Lees on "Architectural Ornament." 8 p.m.
Architectural Association.—Annual Meeting. 8 p.m.
Liverpool Engineering Society.—Messrs. F. G. Bailey, J.A., and Dr. C. A. Kohn on "A Scheme for the Distribution of Energy in Towns." 8 p.m.
British Architectural Association.—(1) Dr. Phené Smith on "Researches and Excavations on the Plain of Troy." (2) Dr. Fryer on "The Walls of St. Thomas Church, Bristol." 8 p.m.

THURSDAY, MARCH 21.

Society of Antiquaries.—8.30 p.m.

FRIDAY, MARCH 22.

Sanitary Institute (Lectures for Sanitary Officers).—Louis Parkes on "Water Supply, Drinking Water, and the Water Supply." 8 p.m.
Institution of Civil Engineers (Students' Meeting).—F. G. Williams on "Pipe-Siphons under the Ouse, at York." 8 p.m.

SATURDAY, MARCH 23.

Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—Inspection and Demonstration of the London Sewage Farm, Croydon.
Queen's College, Cork.—Mr. Arthur Hill on "The History of Architecture." 8 p.m.

RECENT PATENTS:

ABSTRACTS OF SPECIFICATIONS.

1,447.—GLASS ROOFS: S. Deards.—This patent relates to the construction of glass roofs, skylights, &c., where drying is employed. It consists of a T-shaped sash bar of wood or metal cap which fits over it and holds it in place of glass between it. It is locked by means of studs and in passage ways.
1,474.—CLEANING SEWERS: C. H. Cooper.—The object of this invention is effected by passing a drag or scoop beneath the sewers by means of ropes attached to either end of the drag.
1,481.—BRICKS: W. G. Prebble.—For protecting unbaked bricks from the weather. A corrugated iron cover, secured or arched to a suitable degree, is employed for covering over "backs" that are drying.
1,483.—FIREPLACES: J. W. Taylor.—This is a fireplace of angular sides and sloping back, but without the chimney front breasts. The materials for combustion are set on a grid fixed below the level of the hearth, having receptacles for ashes underneath. Provision is made for receiving the surrounding objects from the action of the fire.
1,485.—MOULDING TILES: A. Weil and Another.—Apparatus for moulding tiles: a removable sheet-metal mould is employed, which serves also as a support to the tile during finishing operations.
1,489.—WATER WASTE PREVENTERS: J. Jones and Another.—This is an improvement in flushing apparatus, whereby and flushing pipe contained in the cistern is in communication with the syphon of a second pipe for flushing a direct connection between the flushing pipe and cistern. A spring-actuated self-closing bath valve is employed for breaking the communication after flushing.
NEW APPLICATIONS FOR LETTERS PATENT.
FEBRUARY 25.—3,667, R. Richards, Pipes made of Lead, &c.
3,967, D. McLean, Grindless Plane Iron.—3,971, J. Gough, Tiles for Copings, Conduits, &c.—3,972, R. Roberts, Tiles.—4,009, J. Wilson, Smoke Pipes and Ventilators.
FEBRUARY 26.—4,067, W. Fox, Disinfectant Ventilator, &c.
4,080, J. Adey, Hinges.—4,101, A. Jones, Glazing &c.—4,109, C. Devenish, Windows, Doors, &c.—4,110, P. King, Doors.
FEBRUARY 27.—4,184, F. Barker, Air-Extracting Ventilator.
FEBRUARY 28.—4,272, W. Youlten, Casements.—4,281, J. Fox, Suspending Windows without the use of glass and weights.—4,283, W. Steele, Securing Doors.

4,306, W. Ederington, Preventing Kitchen Boilers Bursting.—4,309, J. R. Kershaw, Horizontal Saw-Frames.—4,345, J. P. Jansall, Cutters for Wood-Working Machinery.—4,359, J. Rogers, Water-Waste Preventers.
MARCH 1.—4,373, J. Adey, Hinges.—4,396, A. Melville, Door-Knob Furniture.—4,438, J. A. Kohler, Liles.
MARCH 2.—4,468, W. Youlten, Fanlights.—4,503, J. Barton, Windows.

PROVISIONAL SPECIFICATIONS ACCEPTED.

833, G. G. Burgum, Window and Casement Fastener.—1,368, A. Widmann, House-bell.—556, P. Maciadyen, Pipes, Junctions, Bends, and other articles from Portland or other cement.—673, J. D. Crockett, Securing Door-knobs in frosty weather.—307, H. Worsey, Door Latches and Latches for Door-closets.—3,177, W. Christian, Windows and like Fastenings.—3,313, T. Wingfield, Device to be used with Circular Saws.

COMPLETE SPECIFICATIONS ACCEPTED.

(Open to Opposition for Two Months.)

4,577, A. Wynn, Windows.—6,890, G. Cory & J. Cashay, Paving for Roads and Streets.—8,357, W. Ross, Junctions for Water Closet and other Cisterns.—8,453, W. Connell, Regulating Fanlights and Skylights.—9,045, H. Dakin, Water Closets, Sinks, and Urinals, and other Sanitary Appliances.—24,438, H. Kühn, Door-Closer with Automatic Lubricator.—4,947, A. Bartlett, Attachment for ladders.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

FEBRUARY 28.—By *Stimson & Sons*: 26, Thornhill cres., Barnsbury, ut. 55 yrs., gr. 84, r. 484, 435/6; 37, Brunswick-st. ut. 25 yrs., gr. 41, r. 324, 215/6; 27, Unstead-st., Finsbury, ut. 99 yrs., gr. 64, loc. 340/4; 110, 112, and 144, Antill-rd., Tottenham, ut. 71 yrs., gr. 134, loc. 450/4; 18, Horace-st., Marylebone, 1, 120/4; 59, Ambrose-st., Bermondsey, ut. 42 yrs., gr. 31, 200/4; 8, Darnley-st., Camberwell, ut. 78 yrs., gr. 54, loc. 281, 240/4; 13, Loughborough-rd., Brixton, ut. 81 yrs., gr. 71, 75, 255/4; 12, Malor-st., Camberwell, ut. 81 yrs., gr. 61, 58, 250/4; 3, and 4, Heaton Villas, Peckham, ut. 69 yrs., gr. 54, r. 324, 240/4; 24, Stafford Mews, Kilburn, ut. 81 yrs., gr. 54, r. 324, 120/4; 24, Peckham Key, Peckham, ut. 11 yrs., gr. 11, r. 454, 325/4; 90, Peckham Rye, ut. 84 yrs., gr. 94, 158, 80/4; 92, Peckham Rye, ut. 84 yrs., gr. 94, 158, 80/4; 5, 7, and 9, Nunhead-lane, ut. 40 yrs., gr. 154, 490/4; 1, 2, 3, 4, 5, 6, 7, 8, Burton-cres., Euston-rd., ut. 11 yrs., gr. 316, loc. 80/4; 43, Canonbury Pk. North, Canonbury, ut. 42 yrs., gr. 390/4; 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

MARCH 1.—By *L. Farmer*: 101, Abbey-rd., St. John's Wood, ut. 62 yrs., gr. 131, 520/4; 112, High-st., Kingsland, ut. 53 yrs., gr. 41, 58, r. 944, loc. 980/4.—By *W. & W. Watson*: 10, Sutherland-pk., Day-water, ut. 51 yrs., gr. 114, r. 534, 325/4.
[Constructions used in these Lists.—F.g. for freehold ground-rent; i.g. for leasehold ground-rent; g. for improved ground-rent; r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e. for estimated rental; ut. for unexpired term; p. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.]

PRICES CURRENT OF MATERIALS.

TIMBER.
Greenheart, B.G. ton 9/0 9/0 10/0
Teak, E.I. do 10/0 10/0 10/0
Sesquial, U.S. do 11/0 11/0 11/0
Ash, Canada do 11/0 11/0 11/0
Birch, do 11/0 11/0 11/0
Elm, do 11/0 11/0 11/0
Fir, Danish, do 11/0 11/0 11/0
Oak, do 11/0 11/0 11/0
Pine, Canada do 11/0 11/0 11/0
Do, Yellow do 11/0 11/0 11/0
Lath, Danish, do 11/0 11/0 11/0
St. Petersburg, do 11/0 11/0 11/0
Waucoot, Riga, do 11/0 11/0 11/0
Swedish, do 11/0 11/0 11/0
Odesa, crown, do 11/0 11/0 11/0
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Do, 4th and 5th do 11/0 11/0 11/0
Do, 6th and 7th do 11/0 11/0 11/0
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Do, 192nd and 193rd do 11/0 11/0 11/0
Do, 194th and

CONTRACTS—Continued.

Nature of Work.	By whom Advertised.	Architect, Surveyor, or Engineer.	Designs to be delivered.	Nature of Work or Materials.	By whom Required.	Articles, & Surveyors, or Engineer.	Tenders to be delivered.
*Imperial House, Haymarket	Porter & Town, C. E.	31 to 32, at 154/1.	Mar 19	*Premises	Staines and Egham		
*Shops, Offices, Two Hotels, & Preston	N. Hill, C. E.	120, 101, and 69	May 27	*21st Portland Street, Engineer	Co-operative Society	R. Fatt	Mar. 26
Severage Scheme	C. A. Chamberlain	31 158	April 6	*4th York Street	West Hill House, J.	R. H. Apple	do
				*Paving Works	Tottenham U.D.C.	P. R. Murphy	do
				*Storage Reservoir, Dinton, Barn, Fe.	Kinross, C. N.B.	J. A. & A. Leach & Co.	do
				*Severage Works, Liphams	Curry	B. J. & J. A. Leach & Co.	do
				*Washford Works	Stockport Corp.	S. Mann	Mar. 27
				*Tide Coal Wharves	London Dock Co.	W. B. & J. A. Leach & Co.	do
				*Dredging Works, Marsh District	Dept. of Townships	Shone & Ault	do
				*Wharves, Mill, Wash Kilns, & S.	Severance Pipe Sewers, & Kersley Hall	A. Wilson	do
				*Mort House, & Liphams	Kebley Lane, T. D.C.	R. Nutall	do
				*Mort House, & Liphams	Kebley Lane, T. D.C.	W. B. & J. A. Leach & Co.	do
				*Mort House, & Liphams	Kebley Lane, T. D.C.	Shone & Ault	do
				*Mort House, & Liphams	Kebley Lane, T. D.C.	W. B. & J. A. Leach & Co.	do
				*Mort House, & Liphams	Kebley Lane, T. D.C.	Shone & Ault	do
				*Mort House, & Liphams	Kebley Lane, T. D.C.	W. B. & J. A. Leach & Co.	do
				*Mort House, & Liphams	Kebley Lane, T. D.C.	Shone & Ault	do
				*Mort House, & Liphams	Kebley Lane, T. D.C.	W. B. & J. A. Leach & Co.	do
				*Mort House, & Liphams	Kebley Lane, T. D.C.	Shone & Ault	do
				*Mort House, & Liphams	Kebley Lane, T. D.C.	W. B. & J. A. Leach & Co.	do
				*Mort House, & Liphams	Kebley Lane, T. D.C.	Shone & Ault	do
				*Mort House, & Liphams	Kebley Lane, T. D.C.	W. B. & J. A. Leach & Co.	do
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				*Mort House, & Liphams	Kebley Lane, T. D.C.	W. B. & J. A. Leach & Co.	do
				*Mort House, & Liphams	Kebley Lane, T. D.C.	Shone & Ault	do
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				*Mort House, & Liphams	Kebley Lane, T. D.C.	W. B. & J. A. Leach & Co.	do
				*Mort House, & Liphams	Kebley Lane, T. D.C.	Shone & Ault	do
				*Mort House, & Liphams	Kebley Lane, T. D.C.	W. B. & J. A. Leach & Co.	do
				*Mort House, & Liphams	Kebley Lane, T. D.C.	Shone & Ault	do
				*Mort House, & Liphams	Kebley Lane, T. D.C.	W. B. & J. A. Leach & Co.	do
				*Mort House, & Liphams	Kebley Lane, T. D.C.	Shone & Ault	do
				*Mort House, & Liphams	Kebley Lane, T. D.C.	W. B. & J. A. Leach & Co.	do
				*Mort House, & Liphams	Kebley Lane, T. D.C.	Shone & Ault	do
				*Mort House, & Liphams	Kebley Lane, T. D.C.	W. B. & J. A. Leach & Co.	do
				*Mort House, & Liphams	Kebley Lane, T. D.C.	Shone & Ault	do
				*Mort House, & Liphams	Kebley Lane, T. D.C.	W. B. & J. A. Leach & Co.	do
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				*Mort House, & Liphams	Kebley Lane, T. D.C.	W. B. & J. A. Leach & Co.	do
				*Mort House, & Liphams	Kebley Lane, T. D.C.	Shone & Ault	do
				*Mort House, & Liphams	Kebley Lane, T. D.C.	W. B. & J. A. Leach & Co.	do
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				*Mort House, & Liphams	Kebley Lane, T. D.C.	W. B. & J. A. Leach & Co.	do
				*Mort House, & Liphams	Kebley Lane, T. D.C.	Shone & Ault	do
				*Mort House, & Liphams	Kebley Lane, T. D.C.	W. B. & J. A. Leach & Co.	do
				*Mort House, & Liphams	Kebley Lane, T. D.C.	Shone & Ault	do
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				*Mort House, & Liphams	Kebley Lane, T. D.C.	Shone & Ault	do

Those marked with an asterisk () are advertised in this Number. Competitions, p. iv. Contracts, pp. iv., vi., vii., vill., and xxi. Public Appointments, pp. viii. and xxi.*

[illegible]

BEDFORD.—For the supply of slag, for the Beds. County Council. Mr. W. N. Leete, County Surveyor.

[illegible]

* Accepted

* Accepted.

J. Jerome Lansdale, Leighton Buzzard	£850	W. Grimley & Son, Sutton Bridge, Lincolnshire	£1,250
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NOTES.—For road-making and paving works for the Walesden District Council. Mr. O. Claude Roberts, Engineer and Surveyor, Public Offices, Dyne-road, Kilburn, N.W.

	Ash- burnham Road.	Crofton Road.	Bathurst Road.	Dur- banke Road.	Buxton Road.	Capetown Road (West).	Chapter Road (E. side)	Churchill Road.	Huddles- stone Road	Letch- more Road	Oxley Road.	Sandring- ham Road.	Windhor Road.	Reacons- field Road.	Minst. gardens.	Wood- ville Road.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
W. Neave & Son	897	0	1263	0	423	0	75	0	960	0	659	0	819	0	773	0
M. Mowlem & Co.,	897	0	1019	0	925	0	423	0	1590	0	75	0	645	0	825	0
W. Wharmby & Co.,	1550	0	1250	0	1019	0	423	0	713	0	135	0	321	0	685	0
Robertson & Grant	97	0	150	0	625	0	410	0	572	0	86	0	591	0	645	0
Jr. Free & Sons	97	0	140	0	1555	0	575	0	115	0	131	0	774	0	968	0
James & Co.,	97	0	140	0	1555	0	575	0	115	0	131	0	774	0	968	0
Newell & Robison,	97	0	174	0	1148	0	481	0	678	0	115	0	663	0	793	0
Wm. Adams,	911	0	1162	0	1226	0	554	0	1457	0	575	0	713	0	745	0
Rogers,	911	0	103	0	950	0	430	0	1013	0	219	0	541	0	581	0
" " " " " " " " " "	911	0	103	0	950	0	430	0	1013	0	219	0	541	0	581	0
W. Wilson,	911	0	103	0	950	0	430	0	1013	0	219	0	541	0	581	0
V. & F. Manuelle	911	0	103	0	950	0	430	0	1013	0	219	0	541	0	581	0
Engineer's estimate	911	0	103	0	950	0	430	0	1013	0	219	0	541	0	581	0

TENDRING (Essex).—For alterations to old schools and building new class-rooms, boundary-walls, offices, &c., for the Tendring School Board. Mr. J. W. Start, architect, Colchester, Clacton-on-Sea, and Harwich. Quantities by the architect.

	Alterations.		Classrooms.		Covered Playgrounds, Offices, Drainage, &c.		Gravelling Playgrounds.		Boundary Walls, &c.		Total.	Park Fencing to Boundary.		Iron Fencing.	
	£ s.	d.	£ s.	d.	£ s.	d.	£ s.	d.	£ s.	d.	£ s.	£ s.	d.	£ s.	d.
Canham	103	0	714	10	315	0	319	0	172	5	1,785	10	103	15	0
Beaumont	103	0	775	0	350	0	265	0	172	5	1,785	10	103	15	0
St. Francis	37	9	738	0	399	0	242	0	104	0	1,530	0	118	0	0
Tarwick	135	0	715	13	360	0	306	7	219	3	1,995	4	218	13	141
West	10	0	740	0	314	0	190	0	166	0	1,316	0	112	0	0
J. Linzell	10	0	750	0	324	0	204	0	135	0	1,350	0	97	0	144
Saunders	1	0	820	0	318	0	224	0	179	13	1,514	0	100	0	0

Accepted for alterations to new class rooms, covered playgrounds, and offices, total, £1,773 13s. 0d. † Estimate not complete.

KEIGHLEY.—Accepted for the erection of premises for the Temperance Society, Messrs W. & J. B. Bailey, architects, Keighley and Bradford. Quantities by the architects.

Mossy and Brackley—Suggested by Messrs W. & J. B. Bailey, and Sunderland, Oakworth, near Keighley.

Townery—Eaton Taylor, Lees, near Keighley.

St. . . . Will in Thornton, Bingley. £5,607 17 6

St. . . . Joseph King, Keighley. . . .

Painting—W. & J. Harrison, Keighley. . . .

Painting—Frank Petty, Keighley. . . .

LONDON For laying 5.56 superficial yards or thereabouts of
9 in. by 3 in. by 4 in. cross-set deal blocks on 6 in. Portland cement
concrete including all excavation and carting, Penzance Villas, for
the Vestry of St. Mary Abbott's, Kensington. Mr. Wm. Weaver,
11 West C. L. Street or to the Vestry. —

	Per yard super.		Per yard super.
	s. d.		s. d.
Edat. Parry	11 0	Jno. Mowlem & Co.	9 11
Newell & Rolson	10 0	Improved Wood Pavement	

W. C. Bower	£ 208	0	0	H. Triggs	£ 20	0	0
J. V. Guld	066	0	0	H. Malett	0	0	0
Sar & Son	939	2	0	L. Parker	830	0	0
Wool	990	0	0	J. Fraunton	£ 1	0	0
W. Akers & Co.	915	0	0	Dalisch	£ 20	0	0
G. Newton	875	0	0				

LONDON.—For the erection of a school in Bow Creek, to provide accommodation for 400 children, and for a house for the schoolmaster, and a hall, for the School Board for London, Mr. T. J. Bailey, Architect.—

W. & A. Nightingale	£12,858	S. & W. Pattinson	£2,948
W. & A. Nightingale	8,621	J. & W. Newell & Co.	8,621
G. E. Wallis & Sons	9,869	C. Cox & Co.	8,620
A. Reed & Sons	8,836	D. Chatteris	8,620
W. Godwin & Sons	9,763		8,179

* Recommended for acceptance by the Works Committee.
 † Withdrawn.

LEIGHTON.—For alterations and additions to infants school, Aldershot, for the Leighton School Board. Mr. J. T. Lawrence, architect, Buzard, architect. Quantities by architect:—
 J. B. Es. £98 6 0 Cook and Son £28 8
 Adams 99 0 Hart and Atkins 117 10
 Jarvis and Son 6 0 Edwards Bros. 788 8

OXFORD.—For erecting Newington Public Baths and Wash-
 houses, Manor-place, Walworth. Mr. E. B. Ineson, architect,
 Laurence Pountney Hill, E. C. Quantities by Messrs. Batstone

London.—For the erection of a new police-station at Kenney's Butler, architect. Quantities by Mr. H. Thurgood.—	Mr. John
Graham	£2,400
Grover	4,097
Higgs and Hill	3,674
Lattley	3,282
Smith	3,650
Hollway Bros	3,875

LONDON—For the erection of a new police-station at Clark's Buildings, W.C., for the Receiver for the Metropolitan Police District. Mr. John Baker, architect, quantities by Mr. W. H. Th. Reed —

Lathey	£670	0	Higgs & Hill	£384	0
Newman	560	0	M-Loway Bros.	737	0
Smith	750	0	Wainwright	746	1
Hart	74	0	Grover	746	1
Derry	7304	0	Greenier	627	0
Richardson	7397	0	Lawrence & Son	6649	9

	For setting bolters, &c.	Total.
I. Tyerman	1,580 00	2,38 50
Preston & Co.	50	28 44
Ryder & Sons	7 20	3 18
H. Lorant	535	28 28
Godson & Sons	537	28 06
Colts & Son	345	28 10
Mowlem & Co.	7 4	73 09
Bell & Gash	27 3	27 88
W. H. Lorden	500	27 50
E. J. Saunders	500	27 50
Hutman & Sons	200	27 81

LONDON - For the erection of loose boxes at Brookfield Stud.
Higate, for Mr. W. Burdett Coutts, M.P., Mr. G. S. Stevens,
architects, 29, Grosvenor Terrace, Higate-road, N.W.

Munday & Sons.....	£76 0 0	W. Barnett	155
J W Dixon	3 3 3		

Alterations and additions to riding school at the above —

			For removing Granary
J. W. Dixon	£77- 0 0		£45 0 0
Holloway Bros.	713 0 0		
Munday & Sons.....	762 0 0		40 0 0

(Constructional newwork and new roof over yard.)

Maides & Harper	1,598	1,243	1,394
Perkins	1,797	2,244	3,641
Northcote	1,434	1,160	3,258
Long	1,438	1,116	3,640
Whitehead	1,311	1,130	3,510
T. Hooper	1,185	1,114	3,440
J. Marsland	1,392	1,595	3,207

Allen & Sons.....	2,000	55	7,257
Allen & Sons.....	2,000	57	7,000
Allen & Sons.....	2,000	58	7,000
Allen & Sons.....	2,000	59	7,000
Allen & Sons.....	2,000	60	7,000
Allen & Sons.....	2,000	61	7,000
Allen & Sons.....	2,000	62	7,000
Allen & Sons.....	2,000	63	7,000
Allen & Sons.....	2,000	64	7,000
Allen & Sons.....	2,000	65	7,000
Allen & Sons.....	2,000	66	7,000
Allen & Sons.....	2,000	67	7,000
Allen & Sons.....	2,000	68	7,000
Allen & Sons.....	2,000	69	7,000
Allen & Sons.....	2,000	70	7,000
Allen & Sons.....	2,000	71	7,000
Allen & Sons.....	2,000	72	7,000
Allen & Sons.....	2,000	73	7,000
Allen & Sons.....	2,000	74	7,000
Allen & Sons.....	2,000	75	7,000
Allen & Sons.....	2,000	76	7,000
Allen & Sons.....	2,000	77	7,000
Allen & Sons.....	2,000	78	7,000
Allen & Sons.....	2,000	79	7,000
Allen & Sons.....	2,000	80	7,000
Allen & Sons.....	2,000	81	7,000
Allen & Sons.....	2,000	82	7,000
Allen & Sons.....	2,000	83	7,000
Allen & Sons.....	2,000	84	7,000
Allen & Sons.....	2,000	85	7,000
Allen & Sons.....	2,000	86	7,000
Allen & Sons.....	2,000	87	7,000
Allen & Sons.....	2,000	88	7,000
Allen & Sons.....	2,000	89	7,000
Allen & Sons.....	2,000	90	7,000
Allen & Sons.....	2,000	91	7,000
Allen & Sons.....	2,000	92	7,000
Allen & Sons.....	2,000	93	7,000
Allen & Sons.....	2,000	94	7,000
Allen & Sons.....	2,000	95	7,000
Allen & Sons.....	2,000	96	7,000
Allen & Sons.....	2,000	97	7,000
Allen & Sons.....	2,000	98	7,000
Allen & Sons.....	2,000	99	7,000
Allen & Sons.....	2,000	100	7,000

LONDON.—Accepted on schedule of prices for fireproof floors at the Patent Office Extension, Block No. 3, —
Mark Fawcett & Co.,

LONDON.—For the erection of pot house and stabling at rear of the "Ashenden Arms, Glyn road, Hounstun, for Mr. G. T. Poole, Mr. G. S. Stevens, architect; —
C. W. Mason

S. Suisun

LONDON Accepted for alterations to No. 2a Grand Parade, Finchley road, for Lloyd's Bank, Mr. Horace Field, architect; —
H. G. Davall, Southampton works, Gospel Oak

LONDON.—For rebinding No. 10, Hol. Carles, St. Martin's, as per plans and specific directions prepared by Mr. W. M. Brutton, 71, Queen Victoria-street. Quotations by Mr. Wm. Hanks, 1, St. Nicholas & Renwick £1 7 6 Rowe £97 5
Vineyard 0 0 Holloway 57 3
Looper 0 0 Courtney & Fairbairn 94 5

PL-ENARTH.—For additions to St. Macbuarne, Penarth, for the Isles Summers:
The Lattey & Co. £758 0 John Jones £840 0
S. Shepton 719 0 John Styles 0

NDON.—For preparing and paving with asphalt a roadway
workhouse, High-street, for the Poplar Union Guardians—
J. Crawford 258 7 6
G. Mills 5 5 0
G. J. Anderson, North-
ampton-street, Poplar 548 0
* Accepted.

LONDON.—For erecting a 22-seat-training centre in connexion with the Kilburn-Jane School, Kensal Green, for the School Board for London. Mr. T. J. Bailey, Architect—

H. Sealey	1995	0	14 Clifton	2566	0
W. H. Smith	5	0	T. Clench	505	0
W. Lyford	573	0	R. Ashburnhams,		
T. Ballard	624	30	Kilburn, N.W.*	561	5

* Recommended for acceptance by the Works Committee.

LONDON.—For providing a new water-closet for the infants of the Leisnham Bridge School, and also for increasing the capacity of the existing water-closet.

lambert & Co.	650	0	A. Bridgde	500	0
lambert & Co.	077	0	D. G. Wells	528	0
H. Davies and W.			R. G. Wells	584	0
J. Madden	578	0	Thos. Wood & Son	584	0
Radford & Son	600	0	H. Morgan	505	16
James & Thornley	050	0	B. Evans, Cardiff	290	0

*Accepted.

POLPERRO (Cornwall).—For building a pier, Baulks, &c., in the harbour for Polperro, for the Harbour Trustees. Mr. Silvanus, W. Jenkin, C. L., Liskeard, Cornwall.—

C. E. Lang, Liskeard, Cornwall, accepted at a schedule of prices

M Inst C E, Stryver	Town Hall, Kensington, W.	
G M	Geo. Wimpey & Co., Ham-	
N	mmer Smith (accepted).....	£440
Murray & Sons		551

NDON. For pulling down and rebuilding ro High-street,
 J. L. Meyers, C. Foulkham & Herbert Riches, joint archi-
 Bronley, E., and 3. Crooked-lane, King William-street,

Raby	Sheffield Bros	£845
Selman	White & Son	727
Jorn & Sons	Salt (accepted).....	727

W. & H. Castle	2307	J. & A. Oldman	2508	
W. & Marshall	395 17	J. & C. Bowyer	255	
W. & Smith	373	W. Akers & Co., South		
Price & Son	274	Norwood	241	
V. V. Goad	290			

* Recommended for acceptance by the Works Committee.

LONDON.—For enlarging the school in Webber-row, South-
ampton, by 300 places, for providing a new house for the school-
master, with a cooking centre underneath, and for other work, for
the School Board for London, Mr. T. J. Bailey, Architect, 10, Abchurch-
Lane, E.C. 4.

POOLE (Dorset).—For the erection of corn-store, stable, and
sach-house for Mr. Wm. High-street, Mr. Ed. Van Schepdael,
C. Rigger, £145 18 6 A. D. Saunders £290 0 0
C. Rigger, 325 0 0 W. H. Gray 285 0 0
[All of Poole
[Architect's estimate, £366 7s.]

PORTSMOUTH.—For stores and additions to offices, for the
Island Gas Light Co. Messrs. Baker & Co. well at

NDON.—Accepted for re-building 57, 58, 59, 60, and 61,
all street, and 65, Milton-street. Mr. R. M. Roe, architect :—
F. Coney, "Fenchurch Station Chambers,"
6, Fenchurch-street £6,100

Downs	£12,557	E. Lawrence & Sons	£12,741
& M. Patrick	12,188	B. E. Nightingale	11,631
Libby & Gayford	12,099	C. Miskin	11,528
oster & Dicksee	11,999	D. Charters, Page-street, Westminster*	11,361
Longley & Co.	11,910		

* Recommended for acceptance by the Works Committee.

Board	£1.130	H. Corke	£1.075
Light & Son	0.090	W. Evans (accepted)	1.650
Ward	1.099		1.50

OUTTHAMPTON.—For the construction of a pile foundation, for the Mount Pleasant Board School, Bevoys Valley, Mr. H. Bizard, architect, Lansdowne House, Castle Lane, Southampton. Quantities by architect:

ash	£2,560	o	Roë & Grace	£3,666	o
Payne	6,090	o	W. H. Bull	6,584	o
	6,972	o			



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The Builder.

VOL. LXVIII. No. 2755.

MARCH 25, 1895

ILLUSTRATIONS.

East End Decoration, Arundel Church.—Designed by Mr. E. A. Fellowes Pryne *Double-Page Ink-Photo.*
"Test Court," Chilton, Hants.—Mr. W. D. Carie, F.R.I.B.A., Architect. *Double-Page Ink-Photo.*
Metal Screen, Burgos Cathedral.—Drawn by Mr. Arthur Bolton, A.R.I.B.A. *Double-Page Ink-Photo.*
Design for an Entrance Hall.—By Mr. H. Seton Morris *Double-Page Ink-Photo.*

Blocks in Text.

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St. Sophia, Constantinople.



PROBABLY no architectural monument that has ever been erected has aroused so much enthusiasm in ancient times, and so much interest in modern times, as the great church erected under the orders of Justinian at Byzantium. Its constructive design and its place in history are alike conduced to this. As the most complete domed building on a large scale which meets the problem of erecting a circular dome over a square plan, it is a landmark in the history of architectural construction. With no known predecessor in precisely the same manner of construction, and no successor on the same scale, it stands alone, a stupendous effort of architectural design and of constructive genius. Whoever was personally responsible for it—for we may take it for granted that Justinian had no part in the matter beyond the comparatively easy one of ordering that something great should be done, and finding the money for it—was one of the world's greatest architects. It has been shown by students of architectural history that the suggestions for the erection of a dome over a square plan came from the East, from Asia Minor and from Persia; but even those who believe most implicitly in the influence of evolution in architecture are unable to point to the remains of any building which, in regard either to size or method of construction, can fairly be called a precursor of St. Sophia. The domes of Sassanidæ (for we decline to accept Dieulafoy's relegation of these remains to the much earlier period of the Achænidæ) were but on a small scale, and the dimensions of the plan were not got over by the employment of the true pendentive, but by finch arches, and in a half-developed and jangling manner. Other examples, of about the same period perhaps, in Syria, exhibit still more primitive method of carrying a dome over the angles by obliquely-placed piers. The Church of SS. Sergius and Bacchus seems in many points an obvious precursor of and (though unintentionally perhaps) preparation for St. Sophia; but

there the dome is carried on a series of supports arranged in circular fashion, or at least at the angles of an octagon, and the construction presents no special difficulty. St. Sophia, on a far greater scale than anything which had preceded it, rises up at once a completely and logically-developed domical building, on a system of construction which had apparently never been attempted on a great scale before, and which only great boldness and confidence in himself, and a thorough grasp of the constructive conditions of the problem, could have enabled any architect in that day to adventure upon and to carry out successfully. The name that has come down to us as that of Justinian's architect is Anthemius of Tralles. At this distance of time, and when we are concerned with an age so turbulent in its character, so fantastic and superstitious in its records, it is difficult to know how far one has got or can get at the truth in regard to anything of personal history and character. But Anthemius is the name handed down to us, coupled with vague and half-traditional statements as to his proficiency in mathematics and geometry. Such acquirements at least are germane to the matter in hand; not without mathematical and geometrical knowledge on the part of some one were the pendentives of St. Sophia built out into empty space, and the dome seated upon them. Anthemius is but a name to us: we know nothing of his personality or character; but a name we must have, for if ever any building was a work of personal genius and not (as some do vainly fable) of the instincts of the artisan, that building was St. Sophia; to Anthemius therefore "let us garlands bring."

In a historic sense too there is a peculiar interest attaching to St. Sophia, arising out of the period in which it was built. It is a kind of landmark amid "that loose eternal unrest" which accompanied the slow melting down of the Roman world into the Mediæval. It marked the point at which early Christianity combined the greatest superstition with the most barbaric splendour; the point also in art, when, though the influence of the old Classic forms was still felt, they were being clothed with a new garment of colour and picturesqueness. Instead of the cold but exquisite grace of Greek architecture and detail, instead of the equally cold and much more commonplace art of the

Roman, there arose a school which seemed to anticipate the future warmth and glow of Mediæval art while preserving much of the fading grace of Greek art. The union produced a style which was not perfect, but which has been almost unmatched for richness and effectiveness of detail, coupled with a passion for rare and costly material. It is possible that the detail of St. Sophia itself was the cause rather than the effect of the sumptuous taste which became characteristic of Byzantine art. Justinian was anxious to hand down his name in connexion with a building unmatched for splendour, and as an irresponsible and unscrupulous ruler he had ample command of funds. And the public of his day was exactly in the state of mental and religious culture to be specially attracted by material splendour in a place of worship. Learning and philosophy were nearly dead, society was in process of relapsing into barbarism, violence and massacre were almost every-day occurrences; and a great church decorated with lavish splendour seemed by contrast a kind of celestial vision, a heaven on earth. Thus it came to pass that St. Sophia elicited, from contemporary or immediately succeeding writers, an amount of rapturous eloquence such as no other building on earth, as far as we know, has ever called forth. The appearance of the dome "as if hanging in the air," the effect of the profusion of coloured marbles on the walls and floor, the glories of the lighting, by silver lamps hanging in chains from the circumference of the dome, or by standards with the lights arranged in pyramidal form, all these and other splendours roused writers like Paul the Silentiary and Procopius to rhapsodies in which legend and fancy are evidently a good deal blended with fact, and which are naive and childlike in their style, but which nevertheless indicate the existence of no ordinary splendour in the interior effect of the building, and of an extraordinary enthusiasm which the contemplation of it aroused in the minds of the spectators.

The descriptions of Procopius and of Paul the Silentiary* are well known to archaeologists, and they need not detain us here, unless for an occasional reference in regard to facts of construction on which they seem to throw light. In the book on St. Sophia produced by Mr. W. R. Lethaby

* The Silentiaries were officials of the Imperial Court.

and the late Mr. Harold Swainson* (to whose untimely and lamented death, shortly after the publication of the work of which he was joint author, reference has already been made in our columns), the most important portions of these contemporary descriptions are translated and brought within the reach of a larger circle of readers than heretofore. It is only necessary to observe that though Procopius professes to be the practical and prosaic historian, his account is padded with legend, and with impossible statements as to Justinian's personal part in the direction of the work, which are mere barefaced flattery, and that his occasional efforts to give some practical information as to the construction of the building only serve to indicate that he neither understood it himself nor was capable of putting his own hazy ideas on the subject into intelligible shape. On the other hand, the Silentiary, who was a poet and put his description into poetic form, evidently describes very carefully, in his own way, what he saw, and wrote his poem on the basis of a minute interior survey of the building, and his account is therefore of considerable historical value, besides the interest attaching to it as an expression of the enthusiastic admiration of a contemporary, and as a composition containing a good deal of really vivid poetic imagery. The publication of a translation of it here, therefore, ought to add a good deal to the popular interest in the book, and may be an attraction to many readers to whom the more technical portions of the subject dealt with would be hardly intelligible.

It is, however, naturally with these portions that we have mainly to deal here. Mr. Lethaby takes St. Sophia not only as a building of great constructive interest for its own sake, but as a type of Byzantine building and its special methods of design and construction.

St. Sophia was the second church on the site, its predecessor having been wantonly burned on January 15, 532, as the result of an insurrection arising originally out of nothing more than what may be called a "row" at some public games, presided over by the Emperor, through the adherents of two factions among the competitors, the "greens" and the "blues," of whom the ringleaders on either side were executed by Justinian's orders; the remaining factions then banding together to put down the Emperor, sack the town, and crown a new Emperor over its ruins. Justinian's energy and resource are indicated both in the prompt manner in which he suppressed the insurrection and got rid of his proposed rival, and in the fact that the rebuilding of the church on a much greater scale was commenced within six weeks after the destruction of its predecessor, and was completed, according to the most trustworthy account, in about six years, a marvelously short period for those days, in the eleventh year of Justinian's reign. Twenty-one years later an earthquake seriously injured the building, and brought down, among other portions, a great part of the large dome, which had to be rebuilt entirely. What we see now, therefore, is the second dome, which was built after the death of Anthemius; in the main, probably, in accordance with his design. The church was reconsecrated five years afterwards, in the thirty-sixth year of Justinian's reign. That the main idea of Anthemius is retained in the interior as now seen there is no reason to doubt; that it was modified in some respects is implied by the Silentiary, and positively asserted, with some attempt at description of the nature of the alterations, by Agathias, another contemporary historian, whose account is also translated in the book before us. It is of some interest to endeavour to realise what was the nature and extent of this modification.

A plan and section of St. Sophia, to a tolerably large scale, will be found in the *Builder* of February 7, 1891, where they were given as illustrations to Professor Aitchison's valuable Royal Academy lectures on Byzantine architecture. As all our readers know, the main feature in the design is a central dome which is internally a segment rather less than a semi-circle,* and externally is reduced to a considerably smaller segment by the raising of the haunches to form a vertical drum round it, 18 ft. in height, in which the windows are pierced. This formation of an exterior drum, and consequently thickening of the wall near its base, as every architect sees at a glance, is exceedingly important in giving stability to the dome by counterbalancing its outward thrust. This dome, we need hardly remind the reader, stands over four great arches on four sides of a square space, of which those on the north and south are partially filled in with walling and arcades, those on the east and west are open, and are each abutted against on their outer sides by a semi-dome, also in segments less internally than a quarter-circle, and also with the exterior section very much flatter and raised so as to form a semi-drum in such a manner as to thicken the section of walling very greatly at the exterior of the semi-circle. It is to be observed, however, that the segment is smaller in the semi-domes than in the main dome, and the flat appearance of the exterior curve much more noticeable.

The authors draw attention to the fact that Procopius, whose business was to write the history of Justinian's buildings, makes no reference to the earthquake and the catastrophe which it occasioned, and that as his book is supposed to have been issued in the year of the earthquake, it must be taken as describing the building as it existed before that event. This is the more probable, as he specially refers to the destruction of the first church, and the glorious opportunity which it afforded; "God permitted them" (the rioters) "to commit this crime, knowing how great the beauty of this church would be when restored." Had he included the event of the earthquake in his work, he would doubtless have pointed out how this disaster had been permitted by the Divine intervention, to give an opportunity of improving on the first form of the dome. If, therefore, there were in Procopius any definite and detailed description of the dome as he saw it, his evidence would be of considerable value. Unfortunately he deals only in generalities, and gives an intelligible description of nothing, from an architect's point of view; but he does in one place give certain measurements as to heights and widths, which the authors say appear so inaccurate that they do not attempt to explain them. We are inclined to think that these dimensions have been dismissed a little too hastily, and that one or two of them appear to be accurate, and the others might be if we understood exactly what points the writer intended to refer to. The following is the passage as our authors quote it:—

"The length then from the door opposite to the holy apse, where is offered the bloodless sacrifice, to the apse itself is 190 ft.; the breadth of the nave from north to south is 115. The height from the centre of the dome to the ground is 180 ft., and of the arches, the width of each in feet is [no number given], and the length from east to west is 200 ft. The width of the opening is 75 ft."

It is in regard to this last measurement that the authors remark on the futility of trying to explain the meaning of measurements so inaccurate. But the fact is that 75 ft. is, by scale on their own plan on page 38, the width of the space between the east and west piers, the portion occupied by the open arcades at the side; 190 ft. is the length from the inside of the west door to the chord of the eastern semi-dome, which

* The internal diameter of the dome, taken above the cornice, is 108 ft. by scale, according to the section drawn for Professor Aitchison's lectures. It is stated as 104 ft. in the "Dictionary of Architecture." These and other discrepancies may result from the measurement being taken as above or below the cornice, by different writers. Its centre is about 9 ft. below its springing-line.

Procopius may have confused with the smaller apse or sacarium beyond it; and 180 ft. is not far out for the internal height of the present dome. So that in regard to three intelligible points the dimensions seem to be correct. As to whether Procopius's height of the dome is right is an important point in regard to the question of the nature of the alterations which were made after the earthquake. The authors do not, as far as we have been able to find out,* give anywhere an authoritative set of principal measurements, and they have not even a section with a scale attached to it, which is a rather serious omission. Professor Aitchison's scale section in our issue for February 7, 1891, makes the interior height of the dome 177 ft. from the floor of the church. If Procopius's height means from the outer ground line to the outside of the top of the dome, his 180 ft. would be very nearly correct. And his 75 ft. for the "opening," if we take that to mean the space between the north and south piers, is exactly right according to the authors' scale plan. What is curious is that they speak (page 212) of the "arches of 72 ft. span" on the north and south sides, which is incorrect, according to their own plan (by scale), while the 75 ft. of Procopius is correct.

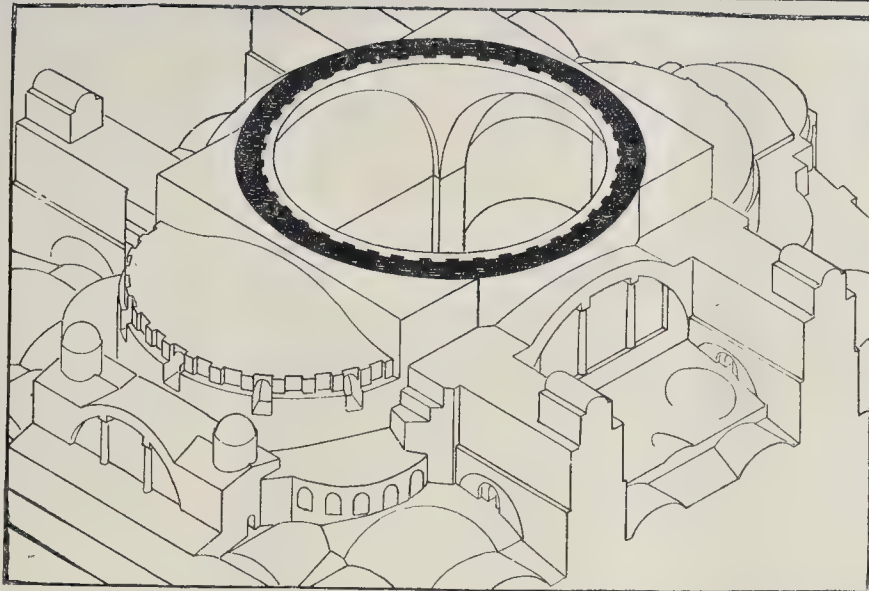
All this bears on the question of the extent and nature of the alterations made in rebuilding the dome after the earthquake. The most detailed description of this is that given by Agathias:

"And as by the earthquake the middle portion of the roof and the higher parts had been destroyed, the king made it stronger, and raised it to a greater height. Anthemius was then dead, but the young man Isidorus and the other craftsmen, turning over in their minds the previous design, and comparing what had fallen with what remained, estimated where the error lay, and of what kind it was. They determined to leave the eastern and western arches (apsides) as they were. But of the northern and southern (arches) they brought towards the inside, that portion of the building which was on the curve. And they made these arches wider so as to be more in harmony with the others, thus making the apse lateral symmetry more perfect; in this way they were able to cover the measurelessness of the empty space, and to steal off from its extent to form an oblong design, and again they wrought that which rose over it in the middle, whether orb (circular) or hemisphere, or whatever other name it may be called. And this also became more straightforward and of a better curve, in every part agreeing with the line; and at the same time not so wide but higher, so that it did not frighten the spectators as formerly, but was set much stronger and safer."

This is a very curious passage, for it appears self-contradictory. It is stated that the north and south arches were altered to make the symmetry more perfect, and yet, at the corollary of this proceeding, that they made "an oblong design." And this discrepancy is all the more curious, as we shall see just now, when considered in reference to the explanation given on another page by the authors, and partly founded on an observation by Choisy. First, however, in regard to the raising of the dome. It is distinctly said here that the height of the dome was raised, that it was "not so wide but higher," i.e. less flat in section. And this indication is confirmed by another contemporary writer, Theophanes, who states that "the emperor restored the piers" (after the earthquake) "and raised the dome twenty feet." It seems impossible to doubt that the dome was raised; that is a plain and easily noticeable fact which would strike even an unlearned spectator, and which was not likely to be overlooked if done, or invented if not done. And there is a point in the existing section of the building which is in favour of the idea that the present central dome was not the original section. A central dome, 20 ft. or 25 ft. lower (for that is the figure given by another witness) than the present one, would assimilate very much in curve and in general effect to the actual treatment of the semi-domes as they now exist. There is a probability that in the first instance the dome and two semi-domes

* It is one of the few faults to be found in the book that it is very deficient in system of arrangement, and it is difficult to know where to look for any particular fact one wants.

* "The Church of Sancta Sophia, Constantinople. A Study of Byzantine Building." By W. R. Lethaby and Harold Swainson. Macmillan & Co.: London and New York; 1894.



View of Vaulted System of St. Sophia, adapted from Choisy.

ould all be designed in the same manner in the same kind of lines and proportion. It is to be observed that Procopius in his account speaks of "a spherical-shaped dome" (σφαῖρος), which accords much more fully with the appearance of the existing dome than with the supposed flatter original one; and moreover, as already observed, gives the measured height of the dome on the floor as very nearly the same as that of the existing dome. Our conclusion would be that, though Procopius no doubt commenced his description on the church as at first built, yet that the earthquake and the reconstruction having taken place before his account was completed, he mixed up the two in it, and that his description and measurement of dome referred to the existing one. That he would omit any reference to the earthquake is not so odd; but, at all events, the supposition we have made reconciles his account with his measurement approximately with the facts; whereas, if he had been referring to the dome, his measurement of height must have been wrong, according to other accounts, by at least 20 ft. He may perhaps have inserted, at the last moment, measurements taken after the rebuilding of the dome.

This, however, is a straightforward and simple matter compared with the question, which was done with the substructure in the building. In connexion with the northern and southern arches we read in the above quotation that "that portion of the building which was on a curve" at those points, was brought inwards. A curious light thrown on this by Choisy, who however does not seem to have altogether appreciated the drift of his own discovery, is illustrated by the perspective drawing of the outside masses of the building and the base of the centre dome, which is a simplification, with certain modifications, of the elaborate drawing which was the last plate but one in Choisy's *Art de Bâtir chez les Byzantins*. Choisy, examining the external square base of the dome, found that it did not originally form a square, but that it was narrower in one way than the other, the circular base of the dome on the north and south projecting beyond the quadrangular base and forming, as will be seen on the

drawing, a "curved wall" outside of it. Choisy's plate makes it a great deal clearer to the eye than this drawing, because he shows it at one angle (next the spectator) as it is here, and at the other angle he shows the mass of masonry which had been added to make the block square and to strengthen the base of the dome. And he says "I verified the entire absence of bond between the first base of the dome and the added work." Here then is a certain explanation of the reference by Agathias to the portion of the building "which was on the curve," and a curious confirmation as to the probable general correctness of the description of Agathias. And Mr. Lethaby (for we may assume that this portion of the book is specially his work) seems to consider that here we have the key to the mystery. The lateral walls of the church, between the piers, were formerly as far back as what he calls the secondary order of arches in the galleries, those which stand about 12 ft. back from the front of the gallery, and thus left an upper gallery 12 ft. wide and 72 ft. long (75 ft.?) open to the interior. The arch over this space, between the great north and south piers, would be really a wide barrel vault 12 ft. in depth. When the dome was rebuilt, the present front arcaded screens were built in flush with the square over which the dome stands, and the cross width of the church thus reduced, while above the impost level of the great piers a shallow arch was introduced of the same size as the east and west arches, thus, as Agathias says, "making the equilateral symmetry more perfect." This does not, however, clear up all discrepancies, because Agathias says that the dome was "not so wide but higher" than it was before. It is impossible to see how this could have been, since he expressly says (and no one can doubt) that the eastern and western arches under the dome were "left as they were," and as the dome now comes close upon them, it could never have been wider than it now is. But the filling up of the north and south arches would give a firmer base for the dome at the sides, and by reducing the visible width of the interior would, as Agathias implies, reduce the alarming appearance of the extent of space to be covered and re-assure the mind of the spectator to some extent; but it is impossible that the

dome itself could have been reduced in diameter, on account, as just observed, of its present relation to the eastern and western arches. Another apparent discrepancy is in the remark of Agathias that they were thus able "to steal off some of its extent to form an oblong design." The fact is that, if we accept (as we are inclined to do) Mr. Lethaby's explanation, the design of the centre of the church was oblong *before* the north and south screen arcades were built in—the clear central space was wider across than it was in length, whereas by the alteration it was made perfectly square. We suspect either the reading or the translation of Agathias is wrong, and that what he really said or meant to say was that the architects, in making the alterations, took off some of the extent (of open space) which *had* given it an oblong appearance. Apart from these discrepancies, Mr. Lethaby's suggestion as to what was really done on the north and south sides, in the rebuilding, seems a very probable one and fairly explains the meaning of the historian. The precise truth we could learn, perhaps, in one way only, by taking down the building stone by stone, when very probably evidence of all the process it went through would be discovered; but that is a method of investigation not open to us.

One of the points which the authors have gone into at some length is the method of construction of Byzantine domes and vaults, and of those of St. Sophia especially. The authors adopt fully the opinion of Choisy, that the object of the Byzantine builders was to erect domes and vaults as far as possible without scaffolding, though they differ from him to some extent in regard to the method in which the vaults were carried out. M. Choisy supposes the curve of intersection of the diagonal over the plan designed as a segment of a circle; "then he considers all sections of each compartment of the vault, taken parallel to its arch, and therefore perpendicular to its axis, to be also segments of circles springing from a series of points on the diagonals, these centres being the axis of each vault." But, as the authors point out, such a system would certainly necessitate a centring for the diagonal rib in the first instance, and therefore is hardly in accordance with the idea that the object of the Byzantines was to avoid the use of



Eastern Dome Construction.

centring. The method by which barrel vaults could be built without centring, with rings of flat brick on edge placed at an oblique angle, the last one finished supporting the next one till it was finished, was shown in the illustrations to Professor Aitchison's lectures, in the *Builder* of March 7, 1891. The principle, it is evident, might be applied to the construction of cross vaults also, if not of too large a span; and in Byzantine building cross-vaults are never used for the larger spaces, which are always domed. For the manner in which this cross vaulting without centring might be carried out, as suggested by the authors, we must refer the reader to their diagram No. 40, and the explanation accompanying it. The system could not be applied to any vault of which the brickwork or masonry was to be visible afterwards—the result would be too clumsy in appearance for that. But in the Byzantine form of vault the intersections are blunt, the upper part of each compartment is almost domical in form, "and the forms are further softened by every edge of arch and vault being rounded, so that the mosaic completely envelops the whole like a vast embroidered gold tissue."

With the dome it is of course a much simpler matter. The authors refer to Choisy's opinion that the great dome of St. Sophia may have been built in the air without centring. We agree with the authors in thinking that there must have been a light centring for the crown of the dome, supported on what had been already built, in order to close the opening; we can hardly conceive of such an expanse of flat arch being erected in any self-supporting manner, seeing that in the crown of the dome, at any rate, the joints must have been arranged normal to its curve. But as to the great portion of the lower part of the dome, with the employment of large flat bricks and keeping the joint-lines considerably more horizontal than with the ordinary joint radiating from the centre,* there need have been no difficulty, or at all events no impossibility, in constructing the greater portion of such a dome without any scaffolding, building it up as it went on. There is certainly something grand and fascinating in this independent method of building, making the materials carry themselves as they go up, and it perhaps more distinctly merits the title of "building," in the truest sense, than the operation of constructing an elaborate temporary timber building to erect the permanent structure upon.

While on the subject of doming the authors refer to a simple method used in the East for guiding and defining the interior and exterior surfaces in dome-building, which is illustrated in the annexed cut. A vertical pole is set in the centre of the space, with a rod at the top free to move in all directions, which defines the outer surface of the dome, while another rod fixed below it, the centre of a larger circle, defines the flatter exterior curve. The scheme B is one suggested by Choisy, on a somewhat similar principle, for also regulating the pitch of the joints of the dome courses where, for constructional purposes, they are not desired to radiate from the centre.

There is so much to notice in this book in regard to other points in St. Sophia, and the subject is of such interest in itself, that we shall devote another article to it.

* See a diagram of arches with radiating and with flatter courses in *Builder*, March 7, 1891, page 189.

NOTES.

THE Architectural Room of the Spring Exhibition at the Walker Art Gallery, Liverpool, presents some novel features. For the first time perhaps in England an attempt has been made to hold an exhibition of architectural drawings which shall possess some practical value. The "perspective" which figures annually at Burlington House is, it is true, to be seen here, but, by the special regulations, it must be accompanied by a plan. This is, at least, a step in the right direction. Still better is the admission of drawings to scale mounted on strainers or framed and glazed. Photographs of executed work, if with plans attached, were also admitted. The exhibition, consequently, is one which, although it may not appeal to the general public—it cannot, however, attract less than the Architectural Room at the Academy—is of considerable interest, not only to architects, but also to artisans and others who can understand plans and geometrical drawings. The room devoted to it is considerably larger than that at the Royal Academy, and contains over two hundred drawings, photographs, &c. Really there are considerably more, as a strainer, counted as one exhibit, often contains half-a-dozen drawings. Mr. J. Belcher sends his design for the completion of South Kensington Museum, including plan, elevation, perspective, and the splendidly-drawn detail drawing of a portion showing the dome, half elevation, and half section. The same architect also sends elevations of the two sides of his building for the Chartered Accountants, and a plan of the same. Messrs. Bodley Garner are largely represented, their exhibits including the designs for Pendlebury Church, Manchester, Clumber Church for the Duke of Newcastle, and the exterior and interior of the proposed cathedral at Liverpool. Perhaps the most interesting set of drawings in the room is that contributed by Mr. Halsey Ricardo. In every case, for each separate work, he sends plans and elevations drawn to scale, and well drawn too, as well as a perspective or a photograph. Equally thorough and complete is Mr. W. D. Carie's contribution. Interesting drawings, more or less known, are also sent by Messrs. Paley & Austin, Basil Champneys, Leonard Stokes, Reg. Blomfield, Chas. J. Ferguson, E. Newton, A. H. Skipworth, F. Inigo Thomas, W. F. Unsworth, Walter Millard, E. W. Mountford, and others. Mr. A. B. Pite and Mr. E. P. Warren send photographs of executed work. The local architects are not strongly represented. Messrs. Grayson & Ould send two drawings; Mr. Edmund Kirby two and a photograph; and Mr. Huon A. Matear two, of which one is an exceedingly well-drawn perspective of a church, which, however, reminds one considerably of Mr. H. Wilson's powerful design for the cathedral at Victoria, B.C. In all cases, or nearly all, all works sent by any one architect are hung together. Altogether the exhibition is a step in the right direction, and we only wish the Royal Academy would take a hint from it.

THE deputation from the Association of Sanitary Inspectors, which had an interview last week with Sir Walter Foster, the Vice-President of the Local Government Board, obtained no promise of any legislative assistance from the Government either towards the increase of the pay of sanitary inspectors or towards the making

of their office more secure in tenure. Sir Walter Foster truly enough observed that these matters were really in the hands of the local authorities, by whom inspectors are appointed and paid. Without a radical change in the present tenure of the office—without, in fact, transferring the appointment of these officers from local authorities to the Local Government Board, it is difficult to see how their position can be appreciably improved. There is no doubt at all that the present mode of appointment renders it more difficult for proper inspection to take place. It is natural that men should not wish to offend their masters and their neighbours. The local sanitary inspector, if he does his duty firmly and vigorously, has one day to make complaint against some person with whom he is brought in daily contact, and, it may be, the next to condemn the cottage of some member of the District Council. There is no task more difficult than that which now falls to the lot of the local sanitary inspectors, and public opinion should support their action on every occasion. Unfortunately the average local opinion on sanitary matters is not yet so enlightened as it should be; when a vigorous sanitary inspector constantly carries out his duty without fear of favour, he is apt to receive discouragement rather than encouragement, and to be regarded as a meddling busybody who fusses about trifles, rather than as a efficient officer doing a good and necessary public service.

A CORRESPONDENT on Monday last published a letter in the *Times* in which he stated how towards the end of last week he visited Putney and Wandsworth, and saw portions of main water pipes being removed filled with solid ice, and how on measuring the depth of these pipes he found that the upper part was barely 15½ in. below the surface. That in the suburbs of London many of the water-pipes—the property of the water companies—have been laid at an insufficient depth there can be no doubt. Immediately above the letter was one from Mr. Archibald Dobbs, who knows more about the law relating to the London water companies than most men. In this he states it to be his opinion that owing to the wording of the Act of Parliament the water companies are exempt from any liability for an insufficient supply or for an absence of water when such supply is "prevented by frost." Secondly, Mr. Dobbs is of opinion that there is no legal power to compel a water company to erect stand-pipes during frost. It is clear, therefore, that the public are wholly in the power of the companies. The Acts have been so framed that the monopoly held by these companies for the public benefit is, in the eye of the law, something for the benefit in the first place of the companies. This is a good illustration of the antagonism which must always prevail between public and private interests when the water-supply of a community is not in the hands of a public body bound to look primarily to the public good. The obvious moral is that the law should be at once amended by making the water companies liable to heavy penalties if from any cause the supply of water is stopped. It is useless to wait for a possible transfer of the water companies to the London County Council or to some other body. Such an Act should be passed at once; it need only be a few lines in length, and even if later on in the season—which, however, is doubtful—the London County Council should become the water authority, the Act, with some verbal amendments, will be of value, since it does not follow that it may not be necessary to enforce the law against a public authority.

WE greatly regret to see the announcement of the death at a comparatively early age (51) of Mr. Ernest Turner, an

architect who has done so much excellent work in furthering the cause of sanitary building and improved drainage, on which subject he had long been recognised as one of the most capable experts of the day. We are able to give some detailed account of his work in another issue. It will be remembered that he took a prominent and energetic part in the organisation and work of the Hygienic Congress in London, and his business-like habits coupled with thorough sanitary knowledge, rendered co-operation especially valuable.

THE Scott-Moncrieff System of Sewage Purification by Micro-Organisms," as it is used to be termed, "The Scott-Moncrieff System for the Bacteriological Purification of Sewage," has now passed the experimental stage, and has been put to the test of actual practice, although not on a large scale. We have already explained the principles underlying the system,* and need only say now that its aim is to effect the purification of sewage by hastening and controlling the development of non-pathogenic micro-organisms in the sewage, whereby the decomposed and (it is hoped) rendered innocuous, without the slightest depreciation of its manurial value. The process is simply acceleration (under proper control) of nature's methods of purification, namely, effluvia and nitrification, and this fact seems to warrant considerable hope of ultimate success. Another pamphlet containing recent reports on the system has just reached us. Dr. G. Sims Woodhead, a known bacteriologist, and director of Research Laboratory of the Royal Colleges of Physicians and Surgeons, speaks favourably of it. So also does Dr. Rideal, Examiner in Chemistry at the Royal College of Physicians; and favourable comments by a Medical Officer of Health, a civil engineer, and an architect (Mr. Philip Webb), are also printed, together with four testimonials respecting actual working of the process at Eastwell (Kent), Oxshott (Surrey), and West-ling (near Horsham). The system has been adopted at Towcester on a somewhat larger scale, with apparent success. Notice that the opinion which we expressed in September last—that a greater amount of filtering medium would be found necessary—has proved correct, for the results which reached us with the new pamphlet show a depth of filtering medium of about 28 in., or double the amount which Mr. Scott-Moncrieff at that time considered sufficient. Several other modifications have also been effected. The question which now remains to be considered is this.—Does the system ensure destruction of all pathogenic bacilli? At this point the evidence is far from clear. Woodhead's statement is very guarded, although Dr. Rideal is a little more definite, even he apparently is not quite satisfied. Meanwhile, the system will be useful for treating the sewage from factory houses, and other more or less crowded buildings, under normal conditions; at present it will not be safe to trust to the process for the destruction of bacilli from infectious diseases. It is possible that the "cultivation" filter-beds may prove valuable to the development of some non-pathogenic organisms, as well as of the non-pathogenic forms which are necessary for the purification of the sewage.

THE "Benardos" process of electric welding is gradually coming into favour in the country for repairing boilers and machinery. Several large mills have laid down plans for it, and rapid repairs made by this method have given the greatest satisfaction. The weld is made by means of an electrode of carbon fixed in a special holder and by the workman, the heat formed by the electric current between the carbon and the metal producing the required weld. The eyes are, of

course, thoroughly protected from the blinding light produced, and it is found necessary to protect the face also, otherwise the light would cause an inflammation of the skin very similar to a severe sunburn. When the carbon pencil and the metal are brought together an arc is struck and the metal in contact with the arc is melted. If the metal be poured away a hole is soon made, and by moving the arc along a slit can be made in the metal so that it can be used for rough boring. Broken eccentric rods, crank shafts, &c., can be welded without any very special skill of hand or eye, whilst the teeth of cast steel wheels can be replaced without the trouble of taking the wheels off the shaft. Perhaps its most useful application is in filling up cracks in bars or sheets of steel. Lumps of mild steel are placed in the crack and melted by the electric arc, the resulting weld in most cases answering excellently. As the electric pressure is very small there is no danger of the workman getting unpleasant shocks, and he can sit or lie on the article he is mending. For working in awkward places this is a very great convenience, and the rapidity with which repairs can be made is very important where time is a primary consideration.

BUTE HOUSE, Petersham, for whose building materials tenders have been invited, is so named from having formed a residence of the Earls of Bute; and members of that house are buried in the church there. Its history is closely allied with those of the neighbouring Sudbrook Park, which belonged to John, second Duke of Argyll, and Ham House, his and his brother's birthplace. The latter, built by Sir Thomas Vavasour for, it is said, Henry, Prince of Wales,* was granted to his brother Charles, who in 1637 gave a lease to William Murray, Lord Huntingtower and Earl of Dysart, whose elder daughter and heir, Elizabeth, Countess of Dysart, brought it in marriage to Sir Lionel Tollemache, of Helmingham, Bart. (ancestor of the Earls of Dysart). Their daughter Elizabeth married Archibald, first Duke of Argyll. Of the issue by that marriage the two sons were John and Archibald, who succeeded as second and third Dukes, and Anne, who married James Stuart, second Earl of Bute, *obit* 1732. John, fourth Earl, whose father, the celebrated Minister, was Ranger of Richmond Park, was advanced Marquis of Bute in 1796. George I. permitted John, Duke of Argyll, to enlarge Sudbrook by taking part of Richmond Park, when perhaps that piece of Charles I.'s wall was taken down. After the death of Sir Robert Wilmot-Horton, Sudbrook Park was bought by the Crown for a total cost of 34,856*l.*, and of its 130 acres twenty were added to Richmond Park, being, we believe, the portion of hill-side between Ham Gate and Pembroke Lodge, granted to the Duke. A proposal, four years ago, to place Sudbrook Park in the building market, occasioned considerable opposition by the inhabitants around, and several bodies concerned in the preservation of open spaces. Petersham is identified with the Patriceshā of Domesday, which describes it as being in Kingston hundred and belonging to the abbots of Chertsey, in whom it continued until 1415, when Abbot Thomas conveyed it to Henry V. With Ham and Sheen it belonged to Anne of Cleves, who gave the three to Edward VI. The church, successor to that cited in Domesday, was rebuilt in 1515. There were buried Vancouver, the voyager, Agnes and Mary Berry (1852), Walpole's correspondents, and Mortimer Collins.

THE death of Mr. Alfred D. Fripp removes from the list of members of the Royal Society of Painters in Water-colours one whose drawings have been familiar to the frequenters of the Society's

* Completed in 1620. Thoroughly restored in 1880-90 by Mr. H. R. V. Franklin, of Deddington, builder, under Messrs. Bodley & Garner's superintendence. See also our "Note" of October 10, 1891.

exhibitions for very many years. Mr. Alfred Fripp's works represented to the last the traditions of a school which may now be regarded as belonging to the past. They look somewhat weak now, beside the works of artists who have acquired both a broader and more powerful style and handling, and a deeper insight into the spirit of natural landscape, and it is undeniable that they were characterised by very recognisable mannerism. But it was a mannerism with so much charm about it that the interest of his works quite survived that of some other old mannerists of the Society. One could always recognise his subjects and treatment at a glance, but they were always pleasant to look at, and were characterised by a delicate effect of light and colour which was not exactly nature, but was a very pretty translation of nature into the special mood of the artist. Occasionally he rose above this level, and surprised one by a remarkable vividness of aerial effect. His subjects were generally from the sea-coast, and almost always under bright light. Within his own domain he was always a careful and painstaking artist, nor did advancing years seem to impair his work at all; indeed one of the most striking drawings of his that we have ever seen—an Isle of Wight subject, if we remember right—was in a quite recent exhibition.

THE letter which has been addressed by Dr. Rowand Anderson to the directors of the North British Railway Company, in reference to the competition for their new hotel and station offices, and which we print in another column, speaks for itself. Six professional men were invited to compete for a very large building and under very minute instructions, and involving an amount of labour which may be estimated from Dr. Anderson's mention of the fact that his plans occupied himself and twelve assistants working extra hours for eight weeks. The directors, without any professional help, settled their minds on these six elaborate sets of drawings in one day, and the selected set are, we believe, by the engineer to the company. *Quid apterius?*

THE ARCHITECTURAL ASSOCIATION: IRON AND BRASS.

THE ordinary fortnightly meeting of the Architectural Association was held on the 15th inst. in the meeting-room of the Royal Institute of British Architects, 9, Conduit-street, Mr. E. W. Mountford (President) in the chair.

Votes of thanks were passed to Mr. James Brookes for conducting the members over All Hallows Church, North St. Pancras, on the 2nd inst., and to Mr. Shaw and Mr. George Sherrin for conducting the members over the Brompton Oratory on the 9th inst.

The Chairman announced that Professor Kerr would begin his lectures on "Materials: Their Nature and Application," in Division III., on Tuesday, April 2.

Mr. J. W. Singer then read the following paper on "Iron and Brass":—

The two metals, iron and brass, are widely different in their qualities and characteristics. The former has been known from almost the early dawn of civilization, while our knowledge of the latter dates from comparatively recent times. Iron is one of the strongest metals, brass one of the weakest.

Iron is nearly everywhere in nature, acrolites being almost pure iron; even the stars showing it through the spectroscopic; and it forms about one twelfth of the crust of our earth. Its particles are mingled in the dust of our roads; in the air we breathe; the water we drink; the food we eat; and is the great colourist of nature, giving the red colour to our blood.

In speaking of a metal, one naturally refers to its history, and when it may have been first used, but this can only be referred to prehistoric times. We know that iron succeeded the bronze period, some writers saying this metal was first used about a thousand years before Christ, others that it was known two thousand years before that era, there being much obscurity on this matter. Yet we read in Deuteronomy that the giant Og had an iron bedstead, and in the 9th chapter we read of iron hammers, the obscurity not being lessened

by writers saying that the Greeks knew nothing of steel. Although Homer speaks of iron as superior to bronze, and no doubt the bronze age and the iron age drifted into each other, and both were used together, the evidences of the iron age not being so well preserved as that of the bronze period, from articles made of iron so soon getting lost when in the ground.

Iron is mentioned very early in Jewish history. In the 27th chapter of Deuteronomy it is said—"thou shalt not lift up any iron tool upon them." Joshua speaks of iron chariots, and Job says that "the writings were graven with an iron pen." Whether iron was used in Solomon's temple we cannot say, but the hammers which were not to be heard there were of iron.

It is difficult to define when iron was first used in England, it having been questioned whether the Ancient Britons made use of it, but they worked in gold and silver, and Cesar states that they had iron bracelets. Yet it is unknown whether the scythes which they attached to their chariot wheels were of bronze or iron.

For many centuries before Christ, and for fourteen centuries after, little progress was made in producing iron from the ore, the Hindoo, three thousand years ago, making iron and steel which cannot even now be surpassed, as they took the finest ore, free from phosphorus and silicates, and melted them with the best fuel, continuing this from four to eighteen hours, the soft composite mass being then rapidly separated from the cinder by hammering and reheating. A mild steel was produced by melting this bloom with charcoal, and thus was made the Wootz steel which Porus offered to Alexander as a precious tribute, and exactly the same process is carried out there to-day.

Iron is known in chemistry by the symbol "Fe," from the Latin word ferrum, and is nowhere in nature discovered pure. Bezzelius found that the metal made pure in the laboratory was almost as white as silver, soft and tenacious.

We in our land of plenty, as regards iron, have but little idea how this metal was valued by our ancestors, and even in the sixteenth century iron had a price that it is now difficult to realize, and which I am able to illustrate from the records of the parish church of my native town. In 1574, the effect of the Reformation brought about a great change as to the furniture of the church, a more simple rubric being demanded, and for that reason many things, such as copes, crosses, and candlesticks, were sold; the churchwardens having entered in their book of accounts of our church the results of that sale, and where there appears, amongst other items, the disposal of sundry bars of iron. After stating that a chest fetched 2s. 4d., an altar-cloth 2s., and a pair of candlesticks 2s. 10d., we see that they received for thirty-seven pounds of iron 3s. 1d., whereas, now such would not be worth selling, and the price cannot be realised, unless we consider the relative value of money then and now. The church-lands then let for 1s. an acre per year, and in the same book appears this entry in the year 1577:—"Paid for pointing the steeple and tower, and mending the lead, and glazing the church windows 55s." Thus money was then at least twenty times its present value, and at this estimate iron was then worth quite 1807 per ton, or 1s. 8d. a pound, instead of its present price of about one penny.

I presume that every one here knows the first process of now making iron, it being simply to put the ore in a lofty furnace, with coal and limestone, so as to slowly melt the ore; the great effort being to see how little coal can be used for each pound of iron produced. Thus, in all rude attempts by a savage race, and even by the Romans to produce iron, they used eight pounds of charcoal for every pound of iron gained, which was a costly method. The next invention was the Catalan forge, which produced one pound for every 3½ pounds of charcoal. To this succeeded the Jersey or Champlain forge, when 2½ pounds of charcoal produced a pound of iron, this method being even now used in America and Spain, where wood can be easily procured. By all these processes the metal was not fully melted, but came out in a pasty form, which was at once hammered, and became good wrought-iron.

The result of cast-iron was brought about by increasing the height of the furnace to gain heating power, it being then found that the iron was melted, becoming highly carbonised, and pig-iron was produced, which was of little use until the way was found of decarbonising the pig, which was done by the puddling furnace.

When cast-iron was first used is a question not easily answered, as the Chinese antedated so

many inventions, but we have no European work in cast-iron earlier than the close of the fifteenth century, as before that date the iron produced was like wrought-iron, and not the result of melting.

Thus the first application of iron for every purpose, whether for use or decoration, was undoubtedly in the form of wrought iron, such as produced by hammering, great perfection having been gained both by savage tribes for their weapons of war, and by the smiths of the eleventh and twelfth centuries, as may be seen in the well-known hinges on the doors of Notre Dame Cathedral. So excellent is this work that it has been seldom equalled, considered either in its massiveness in some parts, as compared to its delicacy of treatment in others.

South Staffordshire has always been the field where first-class iron has been long produced, but it has yet to yield the palm to South Yorkshire for iron of the very highest excellence, especially to the Lowmoor Company, who possess a vein of highly carbonaceous coal combined with rich ironstone, which enables them to produce iron of the finest quality, but the price has always placed it beyond general use, it being three times dearer than several other brands.

It was in South Staffordshire, on the river Stour, where the Dudley family commenced their career, an enterprising young man named Dud Dudley obtaining from King James I, a charter permitting him to use coal in the manufacture of iron instead of wood, one of the conditions being "that no smoke was to be emitted in the process," and thus he laid the foundation of that rich peerage, Queen Elizabeth having issued an order that the forest trees were not to be so much destroyed for ironworks.

Although Dud Dudley discovered the process of melting iron by means of coal made into coke by means of which there is no smoke, and thus surpassing his rivals both in quantity and quality, yet the secret died with him, and as late as 1740 the output of iron in Great Britain was only 17,420 tons.

Up to the early part of the last century all iron bars were produced by the slow process of hammering, at that time the slit rod trade being entirely in the hands of the Swedish and Russian makers, when a young man, named Foley, who was convinced of the fitness of the iron of his district, determined to find out the process abroad, and being a good musician, he dressed himself up as a peasant of the country, and, taking his violin, travelled the country as a wandering minstrel, getting access to many of the foreign works, and then returned, rejoicing that he had found the secret of slit rod-making, at once commencing work near Kniver; but repeated efforts only resulted in failure. Still, not discouraged, he started again on his old tour to find out where he was wrong, and discovered that all was right, excepting that he had omitted to put water on his rolls when working them; again returning to successfully start the great horse-shoe nail trade, which has employed thousands of people, until their work was replaced by machinery.

The Sussex foundries were so famous in the seventeenth century, because, like the Swedish makers, they only used wood as fuel, and as the wood became scarce, that was the cause of these foundries vanishing from the land.

It was from a foundry of that county that came the rails formerly round St. Paul's Cathedral, and some of them still remain round the statue of Queen Anne. This railing was cast in 1714, at Lamberhurst, and was removed in 1874. Part of it was purchased by Mr. Howard, an architect who went to Toronto to practise in that city; but the ship in which they were sent was wrecked, and they had to be fished up from the bottom of the sea. Mr. Howard purchased these rails to place round his wife's tomb, which had been erected in the park at Toronto, and he was anxious to have this particular ironwork, because, in his younger days, he and his wife did most of their courting when walking round this very railing. I may mention that another part of this same railing is now lying in a stable-yard of a gentleman's house near Frome.

As the modern system of very high furnaces only turns out cast-iron, called "pigs," and is very brittle, hence arose the puddling furnace to convert it into wrought-iron, which has been described as somewhat like churning cream for making butter, and by others to be similar to washing the dirt out of linen, except that fire and air take the place of soap and water as solvents to remove the sulphur, carbon, and phosphorus which may be in the cast-iron according to the fuel used—the sulphur coming from

the coal, the phosphorus from the ore, and the carbon from both.

The primary stage of puddling is to melt the charge of white or mottled pig-iron, the molten metal being well stirred or "rabbed" to make uniform, and to incorporate the "fettle"—fettle being the throwing-in of ground oxide of iron which has been worked to the consistence of common mortar. The temperature is then raised until carbonic oxide is released, causing violent bubbles with a blue flame, the rabbling process being done with a long iron instrument protected with refractory cement, until the blue flame ceases. Bright grains of iron appear, the size of the nature of wrought-iron. Then the puddler reduces the heat and begins to ball the iron into lumps from 60 to 70 lbs., which are then ready for the hammer or the rolls. This process gives the iron a kind of fibre, making it less likely to snap.

Another treatment of cast-iron is to make what is known as malleable iron, first used at the beginning of this century, and is essentially cast iron made flexible by the process it goes through of annealing. The best Cumberland iron is required, and when the castings are first made they are hard and brittle. These are placed in pots, surrounded by ore of the same kind as the castings were made from, and are then subjected to heat for about a week, a conversion then taking place, like the formation of steel, the pots taking about three days to get to a white heat, which kept up for twenty-four hours, and then another twenty-four hours is allowed to die off the castings being then ready for use.

My paper being upon iron, it is not necessary to treat of steel, but it may be mentioned that iron and steel differ chiefly in the carbon which is mingled with the pure iron molecules—wrought iron containing little carbon, steel some, cast iron more. This is most of the story, but, of course, not all. Thus, steel can be produced by taking carbon from cast-iron, or by adding carbon to wrought-iron.

Wrought-iron is almost the only metal that can be welded together, which means that what is brought to nearly a melting-point, which is known by the sparks coming from the fire, and after some silver sand has been thrown in the fire to prevent oxidation from the air coming to the surface, the two parts of action the two parts brought together, and by smart hammering they become united in one solid piece. For this process three things are necessary—good iron, good fuel, and a skilful and quick workman. The fine work on anvils are put quite close to the forge, as small fine work cools even in the trace of a few inches.

It is this quality which gives to wrought iron its great charm as a metal for ornamental work, for charm that is all its own, and enables the smith to produce work which can be carried out in any other metal. No metal so repays a skilful workman as wrought iron, and in no other material is, I think, the distinction so evident as the stamp left upon it of good or bad treatment. The smith must model his forms while the iron is hot, and no amount of after cutting and filing will produce that free and artistic feeling which a good workman impresses his work.

How wide a subject is that of iron may be understood in mentioning that in Great Britain alone there are 16,000 places where the same is dealt with in some form or another, and 7,000 persons principally are engaged in carrying out industries closely connected with it. Even the various sorts of iron are each a study not easily mastered, there being so many varieties of this metal, each which is again sub-divided into many brands, even the furnaces for the raw material produce many different sorts, some turning out Hematite, others the kind called "Mine," or "Par Hematite," also cinder or Ferro-Manganese; and in steel works there are the different sorts of Bessemer, the open hearth, and the crucible. There is also thirty-four distinct allied trades connected only with the manipulation of iron, not including the production of the raw material, from the making of wire, chain, and rope making, and works, &c.

There are many varieties in even the subdivision of wrought-iron, the merchant iron, whom we purchase this metal, having on his list eight sorts of wrought and fourteen kinds of steel, the wrought-iron varying from 6½ to 22½ tons, the steel running from 12½ to 68½ tons. Each of these would have a different brand or mark, each of the varieties being the production of a special firm.

To ensure good iron being used, it would be well for every architect to know the hieroglyph on it, as the appearance of bars at 6½ tons, a

much the same as that costing three times the amount. Thus the cheapest iron is Welsh, having a crown impressed on the bars; the next is at having N H & S with a crown—this being in the north of England—costing 7½ s. a ton; the next quality has Netherton Best, with a crown between the words; after this, comes the old brand of B. H., this is 8½ s. a ton. S. C. with a crown is very fine iron at 10½ s. a ton; charcoal iron has the letter L in a circle, this being 17½ s. a ton, and is used for cylinders, boiler-plates, and fine iron, where great tenacity is required. England has long been famous as the centre of the iron industry of the world; but I fear there is a feeling that we have passed the zenith of our prosperity, for Germany and Belgium are fast treading on our heels, the President of the Iron & Steel Institute, in his late address, giving a warning when speaking on this subject, saying that from 1873 to 1875 our exports had fallen from thirty-seven to twenty-five millions worth of iron, that is twelve millions less in only two years, and even that low state they were five millions above the exports of 1893, which deplorable state of things arose from the increased price of coal, and the lamentable strikes throughout the country, although the wages paid to our men were 10 per cent. above foreign workmen. With such competition how can England compete with the world in this industry, and her greatness in the iron trade, is, I am afraid, a thing of the past, unless a change comes over the mind of the iron workman.

Having spoken on the history and manufacture of iron, I fear to exhaust your patience to more on it, than to make a few remarks on application to architecture. The subject of value of iron for constructional purposes is outside the scope of my paper. In this capacity forms part of the anatomy of architecture, with which you are only too well acquainted.

For shall I refer to the modern application of metal, such as in railway stations, the Crystal Palace, &c., where the construction is fully exposed to view. These, though triumphs of engineering skill, have only such beauty as comes to a skeleton.

I cannot speak with enthusiasm of the examples which have been used by itself and for itself, such as the well of Quenten Matsys, all such having a tendency in my opinion to look meagre and very stricken.

It is where it plays a more unassuming but useful rôle as an accessory or adjunct to a building that it finds its best expression. Within limitation, quite enough field is left to tax all energies of the metal-worker. Its strength, flexibility (if properly treated), and the way that it lends itself to every method of manipulation, the qualities that specially commend iron for application in connexion with architecture, for ornamental, grilles, gates, lighting purposes, door handles, &c.

Very numerous are the other uses for ironwork in building, and quite equal in number are the possibilities in the way of decoration, and I think it will be admitted that when treated by a master hand, the metal never looks obtrusive or vulgar, that it gives additional value and interest to the whole work.

In door-fittings, for example, what force and beauty there are in some of the old hinges, from the almost plain strap, with its few vigorous lines, to the forged and chiselled masterpiece of the twelfth, thirteenth, and fourteenth centuries. Possibly our modern smiths will never find them.

It is to venture to hope, however, that in another branch, namely, screens, we may yet make some advances. The old smiths laboured under some disadvantages in this respect compared with ourselves. They had no machinery as we have for producing bars of all shapes and sizes, or sheets of any thickness and dimension. Thus for large ones they had to fall back upon wood and glue.

I do not wish to decry either material for this purpose, but I think there are often occasions when a screening off is necessary without obstruction of light or division of the perspective of the design. Then I venture to say that iron is naturally the material for the purpose.

Screens may be made to exhaust all the resources of the metal-worker—forging, chiselling, casting, repoussé work, enamel and addition of ornamental, mouldings of all sections, and every scroll, and leaf-work of every kind. I do not mention that several eminent architects have drawn attention to this interesting subject, I little doubt that it will receive still more of the future.

Iron has found its last and not least appropriate

application in connexion with the electric light. I fancy the artists of the Middle Ages and the Renaissance would have fairly revelled in the various treatments suggested by this triumph of science.

The delicate treatment that this mode of lighting seems to demand from its very nature, needing no tubes and very little support, is just the scope that calls for the playful display of fine wrought-iron work. I often think we are too serious in our ornament, and give it too laboured an effect, as if it had been designed and wrought after most painful and serious consideration.

There are several features that should make us hopeful of the future of iron-work in this country—namely, the attention now given it by architects, also the help now rendered it by science, so that good iron and steel can always be obtained with care in selection. I think I am also justified in saying that many of our smiths have attained a wonderful amount of skill. No doubt what we most lack is the taste, or instinct, for what is within the power of the material. Also probably we are only gradually learning how much of the work should be done within the glare of the smith's fire, and how careful one has to be not to take the life out of the work afterwards.

One great evil we have to contend against is the hurry and drive of the present day, which does not always leave the worker time to work with all the loving elaboration as of old. But when all is said that can be against the present condition of things, I still think that we ought to be in a condition to produce iron-work in harmony with the best architectural products of the epoch.

I must now say a few words upon the subject of brass. From an artistic point of view this metal does not hold so high a position as bronze, as it is inferior to the latter in many important qualities. Its colour is not so good, its contraction in casting is greater, and in a molten state it does not run so freely into the mould; also it is not so satisfactory a metal for the chaser to manipulate. Still, it is the better known and more-used metal of the two, one reason being doubtless that it is cheaper, unfortunately a most important consideration in these days. Bronze is the metal in which the sculptor usually produces his work in metallic form; brass, on the other hand, being the metal we see around us in the numerous objects of everyday use.

Brass is a compound alloy of the two metals copper and zinc, bronze being an alloy of copper and tin; and it is difficult in any historical account of these metals to distinguish clearly which is intended in any earlier mention of brass than 1721, when zinc was discovered, or rather produced by Henckels, as a commercial metal. But the word brass has been used far longer than this idea of the metal as is now understood by that term, and the name for it has been supposed to come from the Spanish word "brassas," meaning the colour of flame, our word "brazen" with its many meanings, no doubt being derived from the glaring appearance of the polished metal.

This metal differs greatly in its history from iron, as casting in the latter has been the last development of its use and application, whereas with brass and bronze that was the first form as to the employment of these alloys, and all the earliest finds are the result of casting as the most ready application for their use, and the pre-historic nations made beautiful castings in bronze, whereas iron was known for over three thousand years before Europeans could succeed in casting it in a fluid state.

We read in Hebrew history of "Mountains of brass," "Dig brass from the hills," "Brass molten from stone," but as this metal is never found in nature, no doubt copper is the metal intended. Yet it is singular that the word copper is only mentioned once in the Old Testament.

It may have been bright copper or bronze of which the brazen serpent was made for Moses, and so also when we read of "Brass as precious as gold" for the vessels which Ezra caused to be made for the Temple; but this much is certain, that all the metal work which Layard found at Nineveh was made in bronze and not brass. So, no doubt, was the famous Colossus at Rhodes, 105 ft. high, taking twelve years to make, costing 300 talents, equal to about 118,000*l.* of our money. The progress in modern manufacture may perhaps be in some way indicated when I mention that our firm has been allowed less than the same number of months to reproduce a monument in bronze about half the size of the Colossus, and I regret to say that for this work we receive only about one-hundredth part of the sum that was paid for the Rhodian giant.

Doubtless all the metal-work of which such details are given for Solomon's Temple, as to the "gates and pillars of brass," were really bronze, and has been wrongly translated. It may be noted that bronze is just the metal which even savage tribes would soon learn to produce, as in such places as Cornwall, where copper and tin are both found in the native state, the first time they became fused together bronze would be the result.

It is supposed that the Greeks and Romans knew nothing whatever of the ores of zinc, which are quite infusible alone, and it was not until 1270 that they were mentioned by any European writer. After that date they were reduced to a malleable state by putting 40 parts of copper with 60 parts of carbonate of zinc, when 60 parts of brass were the result. Even up to 1805 zinc was regarded as a semi-metallic substance, and only since that date has assumed the importance of a large industry for many purposes.

That it may be seen how difficult it was to produce large pieces of so-called brass, I may mention that up to the fifteenth century it was found impossible to make a piece of metal which could be hammered out as sheet brass beyond about 2 ft. square, whereas now it can be had 20 ft. long, but even at this late date the metal was more bronze than brass from its having tin in its composition. This will be seen from the colour of the piece of metal I can show you, and which I have had polished so that its red colour may be seen.

It may here be noted that a little confusion has been caused by some workers of the present day, terming the metal in which they engrave memorial tablets "latten brass." This, of course, is a misnomer, as it is merely a repetition of the same word in two languages, as the old French word for brass was "laiton."

The metal was so costly that in the sixteenth century they often destroyed earlier memorial brasses by turning them round and cutting the new designs on the back of the older ones. I have the pleasure of showing a few rubbings of brasses which I made in Belgium, which indicate very clearly the sizes of the sheets which could then be obtained. Also some of these rubbings, you will see, are the backs of brasses which have newer designs engraved upon the other side of them.

Brass-work, strictly so called, was not attempted in England before the time of Henry VII., and the railing round his tomb in Westminster Abbey was soon after made, the trade getting general in the time of Elizabeth, who encouraged workmen from the Low Countries to come to England. Yet in 1649 some large works established at Esher, in Surrey, proved a failure, ending in ruin to the founder. The next attempt was in 1678, when the Prince Rupert Mills were started. Then came some works at Hackney, called the Temple Water Mill Works, water being used to drive the hammer, this being before rolls were invented. After this came the Baptist Mills, at Bristol.

Up to this time brass was only produced by using calomine, and melting copper with it, but in 1721 pure zinc was produced, and great changes took place soon after in the manufacture of brass.

As already stated, this metal is a mixture of copper and zinc, and these are run together in a state of fusion, in various proportions, to form the many kinds of brass that are needed—copper being the chief part of the alloy. The Japanese are said to have 200 varieties of these alloys, according to the colour they desire in the finished metal.

The zinc group gives:—5 parts copper to 1 of zinc to obtain rich sheet brass; 4 parts copper to 1 of zinc for Pinchbeck brass; 3 parts copper to 1 of zinc for Dutch metal; 2 parts copper to 1 of zinc for ordinary yellow brass; 1 7/5 parts copper to 1 of zinc for pale brass; 1 2/5 parts copper to 1 of zinc for dipping brass; 1 part copper to 1 of zinc for hard solder, it being understood that the more zinc is used for the alloy, the cheaper is the metal produced, and the less durable it becomes.

Although my remarks are upon brass, it may be well to give the alloy of copper with tin, *i.e.*, bronze, as these metals are so closely allied.

20 parts copper with 1 of tin gives a rich red metal; 10 parts copper with 1 of tin gives the best form of bronze; 4 parts copper with 1 of tin gives bell-bronze, which is brittle, and unfit for any other use.

The best metal for taps, cocks, &c., is composed of 4 parts copper, 1 lead, 1 zinc, and 1 of tin.

Up to a late period of the last century the manufacture of brass was a slow and tedious pro-

cess, taking at least twenty-four hours, as they used the carbonate of zinc, or calamine, with the copper, in taking that time to reduce the ore, and unite it with the copper; but now that the metal zinc can be obtained in a pure state, the process can be completed in about an hour, for as soon as the copper is melted, the zinc is then added, either in a molten state, or is plunged down to the bottom of the molten copper, and then well stirred, or in the casting, the zinc being the lighter metal, will be found too much in the upper part of the casting.

Any of the above alloys can be easily cast, but no ornamental work, or any object, excepting plain block ingot, can be cast in copper alone, the contraction of this metal in its pure form being so great that, when cooling from the molten state, it pulls itself to pieces when anything prevents that contraction. The difficulty attending contraction will be seen when I mention that the base of the statue of Lord Napier contracted just over one inch, and if provision had not been made for this, this mass of metal, weighing nearly half-a-ton, would have pulled itself to pieces in cooling.

The Chinese have a clever method of reducing the effects of contraction as much as possible, by making the flask in which the casting takes place to contract in an equal degree with the molten metal, thus keeping the mould close to the metal, and by this means getting a sharper result.

Brass is very tenacious, but it has this defect, that if the tension is continued, a singular molecule change takes place, rendering it rotten and most unfitted to support any heavy weight.

This fact was evidently known to the brass workers of the sixteenth and seventeenth century, for it will be noticed that they never used brass to suspend the large brass chandeliers made about that date, and so often seen in our churches, but invariably used iron rods. It has been said by authority that every brass pendant hung by means of brass supports will drop within fifty years. This may be an exaggeration, but brass is not a suitable material for the support of any heavy object.

Brass is the metal in which a very large proportion of what is known as objects of applied art are now produced, bronze being retained for fine art. And to bring it into suitable shapes, brass is cast, drawn into round wire, flat strips, hollow tubes, and rolled into sheets, and in these various forms easily leads itself to the manipulation of the workman.

There is now no time to more than just refer to the long series of operations through which this metal passes in its many different modes of treatment. Thus in a molten state it is cast into suitable forms moulded in sand. The model from which the mould is made may be either carved in wood or modelled in clay. The castings, according to their shape and the object for which they are required, are either turned in a lathe, or are chased. Brass is also beaten into forms or embossed, bent into scrolls of various kinds, when in the shape of strip brass, and also there is the large subdivision of engraved work.

Mention should also be made of the process known as spinning. The form of the object that is to be spun is first made in either hard wood, or if a great number of the article is required, it is made in metal. This form, which is termed a chuck, is put in a lathe, and against it is fixed a brass disc. The lathe is then put into rapid motion, and various steel tools of different shapes pressed with considerable force against the disc, beginning in the centre, and gradually working outwards as the metal yields to the pressure, and takes the form of the model. It is a very interesting process, and astonishing how quickly a good workman can spin a number of forms, which, if they had to be hammered up, would entail much time and labour.

Brass is also used for repoussé work, and this process is, perhaps, the one that requires the most highly skilled and artistic treatment of any through which the metal passes. It is not quite such a suitable metal for this purpose as copper, as it is not so soft, and cannot be stretched so easily without cracking, but this method of execution has been, and is still, very generally employed for converting this metal into ornamental forms—the processional crosses on the table being interesting examples of the application of repoussé work.

After brass has been treated in one or other of these processes, it is either polished or dipped in an acid solution and burnished, to give the metal its bright yellow colour, with which we are so well accustomed.

As brass cannot be welded like iron, another mode of attaching the various parts of a piece of

work has to be adopted, and, as may be imagined from the general use of this metal for the manufacture of ornamental forms, this process, which is known as soldering, is not a difficult one. The two surfaces are united by the application of sufficient heat to melt a more fusible and baser metal which is introduced between them, and which combines with both, and firmly unites the two parts.

It will thus be seen that many industries throughout the country are the result of the many processes through which this metal passes, before it comes before us in the form of, say, a lectern, or an altar-cross for our church, a gas-bracket, or an electrolier to light our room, a door-handle, or a fender; and, perhaps, no metal has a more universal application, as it is used for almost every form of ornament needed in metal for either ecclesiastical or domestic purposes.

As brass is a metal that easily tarnishes, it has been found necessary to coat it with a thin substance to preserve it from the effect of the atmosphere. This is termed lacquer, and is a thin, transparent varnish put on the metal when hot. If the object could be kept from moisture being deposited upon it, and be occasionally wiped over, there would be no need of its being lacquered, but as this does not seem possible the work is usually lacquered, and not always with satisfactory results, for you must often have noticed the dark streaks upon memorial brasses, the reason being that generally such work is in a church, of which the heat is only raised on the Sunday. The air then gets warm much sooner than the brass, which is on a cold wall, the wall taking a long time to get its temperature raised, and during this time the moisture is deposited on the brass. This cannot be absorbed, as on the surface of the walls, and the moisture runs down the brass, producing streaks on the metal, and are caused by the lacquer being the better plan, I think, is not to lacquer a memorial brass, for it should not be difficult to find willing hands, who about once a month will give such work a few minutes' attention, and this would be sufficient to keep the metal a good colour.

It is a question if it would not be desirable to make a larger use of bronze in preference to brass. I confess that for many purposes I consider the former the best metal. Thus, for work in churches, I think bronze the better material of the two. It is more durable, of a richer shade, and it retains its colour much better, as brass so easily tarnishes, on account of the zinc in its composition, and the difference between the cost of the two metals is really little; in fact, our firm is always willing to supply bronze at nearly the same price as may be quoted for brass. I believe in the future bronze will be much more generally used than it has been in the past.

The application of brass to architecture is not quite so direct as in the case of iron; as brass, being cleaner to handle, and no doubt also because of its colour, and the facility of its manufacture, is more often used for movable pieces of furniture, such as lecterns, candlesticks, crosses, vases, and numerous articles in daily use.

It is now recognised, however, that even a piece of furniture has its influence upon a building, and deserves and repays the architect's attention. It is admitted, at the present day, however it may have been a few years ago, that it is hardly expedient to turn the architect out of the house as soon as the four walls are built.

Moreover, almost every fixture applicable for iron has also been made in brass, with more or less success, the adoption of the latter giving a more luxurious effect than the harder and less costly metal. We all know the rich appearance of the fine old coronets, with their little turrets and rich bands of ornament, which date back to very early times.

Triumphs of art were the old brass shrines on which devout Christians lavished their best efforts, and although so elaborate, they do not give the idea of laborious execution, but almost spontaneous growth. Abroad I notice that brass altars have often been produced in recent times; they are very rich in workmanship, and may perhaps with advantage be adopted in this country.

I think in the later French styles, the glitter of the brass pendants and brackets greatly contribute to the very finished and furnished aspect of the period.

England is perhaps not so rich as some countries in examples of old brass work, but there is a certain dignity of style about such as we have—for instance, the old brasses and lecterns, which have been revived with some success.

I must now bring this imperfect sketch to a

conclusion with the earnest hope that the craft connected with iron and brass may be developed and flourish to the advantage of architecture.

I need scarcely add that their future success depends largely upon the profession represented by the gentlemen I have had the honour of a dressing this evening.

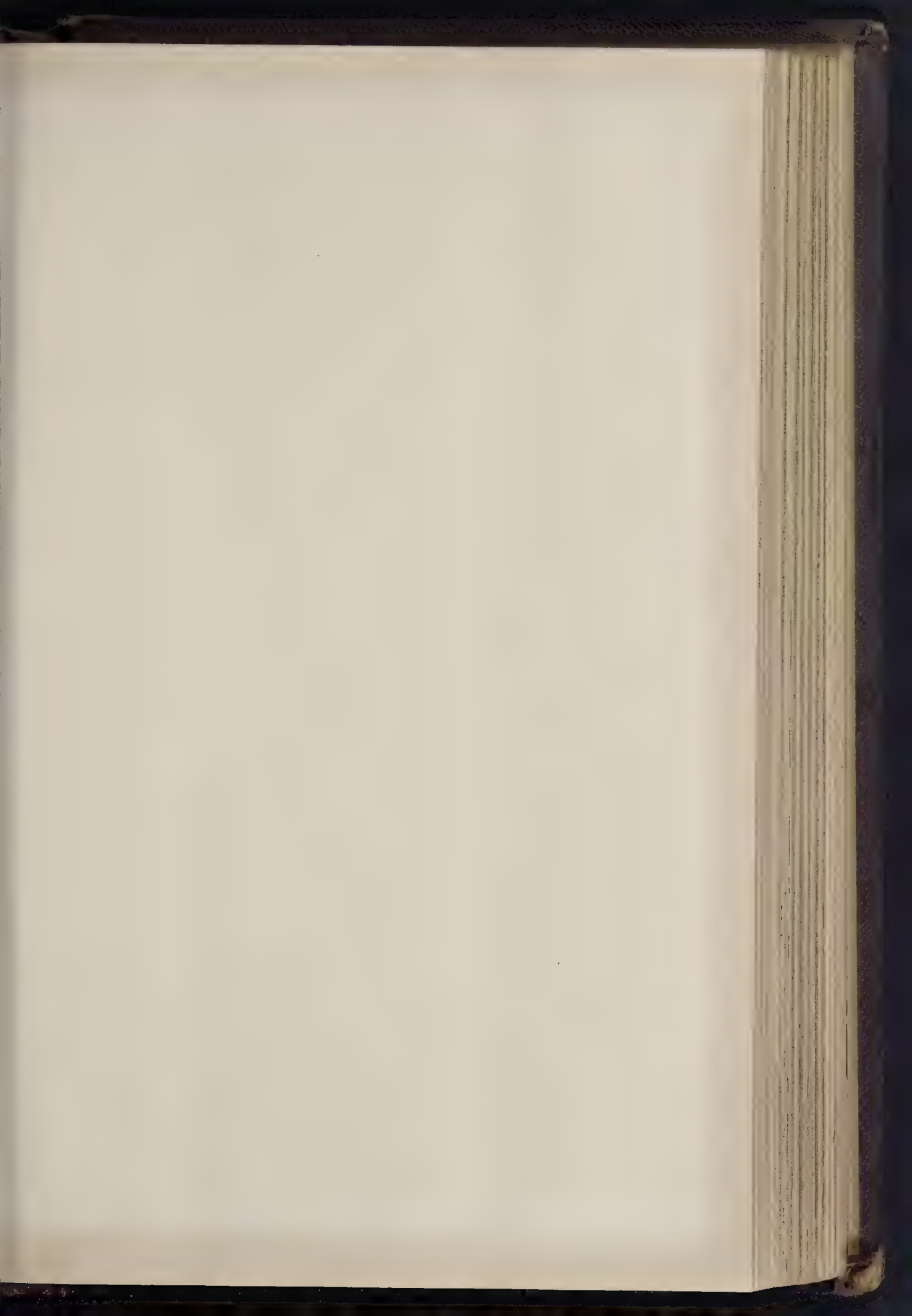
The Chairman, in inviting discussion, said members were very much indebted to Mr. Singer for coming all the way from Frome to read a paper. Mr. Singer, he was afraid, had gone in parts of the subject into which they were hardly likely to be able to follow him, but there were good many points in connexion with iron and brass on which discussion might arise.

Mr. Matt. Garbutt proposed a vote of thanks to Mr. Singer for his very interesting paper. The subject was a large one. It had always been a puzzle to him to know how the Orientals had produced the enormous forgings of iron, of which the famous lat at Delhi was an example, at a period when heavy machinery was, so far as we can discover, unknown. Mr. Singer had truly said that was a pity bronze was not more frequently used in place of brass. Bronze could now be obtained of a colour and texture scarcely distinguishable from brass, costing very little more than brass, and which would keep its colour far better than the inferior material. The Japanese excelled in producing artificial patinas on the surface of bronze, obtaining by this means a very wide range of colour. This seemed a most appropriate method of surface treatment for metal, and might be applied to many small decorative features in connexion with architecture, such as hinges, door fittings, &c., as these patinas required no protecting lacquer, stood handling well, and retained their beauty for an indefinite time. Brass, he believed, could be treated in a similar way. He would like to know if Mr. Singer was aware of the process by which the Japanese obtained the colour of iron, and fixed it, so that it remained a rust upon patina, and not as a mere local accumulation of oxide?

Mr. Singer replied that the process was unknown in this country.

Mr. J. C. Stockdale seconded the vote of thanks. The paper should be of some assistance to them in designing, because if they remembered that brass had to be lacquered to retain its colour, it would deter them from using it in many ways. For instance, if they used brass they must bear in mind that if they did not wish to have it lacquered, it must be of sufficiently smooth design to allow of its being kept polished by hand. Then, again, if bronze was to be used instead of brass, the question was whether they could use it for repoussé work, or if it would be too brittle. The lecturer, in tracing the history of brass, had referred to the cymbals so often mentioned in the Old Testament—whether they were made of brass or of some other metal? There were certain things which should be kept in mind in designing wrought-ironwork, and particularly in deciding the sections. It was easy to get a good effect of paper, but the result was often very different when the work was carried out. A square section should be used with great caution in scroll-work, for though, on paper, a light effect might be obtained, it should be remembered that a square had four sides, and when seen diagonally the result was very much heavier. A circular section in scroll-work could be used with greater safety than a square section, for the reason that the size was always the same, whichever way it was looked at.

Mr. H. A. Satchell thought that much might be done with the use of bronze in tablets and decorative features, such as the friezes of buildings, especially if it were possible to obtain a legible lettering in the bronze with the name of the building or the parties for whom it was built. He had recently used a bronze panel, with the letters merely polished, but these had quickly taken a beautiful half-tint, and, though artistically pleasing, were not at all satisfactory to the owners of the building, as they were illegible at a short distance. He would therefore like to ask Mr. Singer if he could suggest any method of treating bronze in two colours otherwise than by gilding, to enable one part of the pattern to be defined? He would also like to know what was the practical difficulty of lacquering brass work so as to do away with the necessity of frequent cleaning, especially in the case of domestic articles, such as candlesticks, fireplaces, and grates? Was there any way of ensuring that the lacquer used would stand? Also, why did the old wrought-iron used for scrolls, &c., last so much better than the modern work? The old wrought-iron scrolls were still in a good state of preservation, whereas





THE RESURRECTION



EAST END OF JERUSALEM. ABOVE: CHURCH OF THE HOLY SEPULCHRE.

good deal of the new work looked shabby after being fixed for six months. Was there no way of getting something which would keep the surface of ironwork free from rust?

The Chairman said he had always been rather puzzled as to where Moses obtained the brass with which to make the brazen serpent, as it must have been rather scarce there. Mr. Singer referred to the Sussex foundries, and their falling into disuse, owing to the failure of the supply of charcoal. There seemed to be some of these foundries being re-started, if the metal now being looked for in Sussex turned out to be of any use. He did not know, however, if it was a thing to be desired, because at the present time Sussex was a beautiful county, it was too dreadful to think of it being turned into another Sheffield. As to screens of iron or brass, he had never seen one in a church which was satisfactory as a screen. Speaking of electroliers, Mr. Singer had said that he could fancy how the artists of the Middle Ages would have revelled in the treatment of these. From his (the speaker's) experience of electroliers, he could say that the wires in them are a greater nuisance than gas-pipes. An electrolier with six or eight lights had the same number of wires, and these caused more trouble in the old gas-pipes did. Most people seemed to look upon lacquer on brass as they did upon electro-plating, and were unable to understand if the lacquer came off, the brass would be as good as before, and possibly a trifle better. The only objection he could see to lacquer was that it made the brass-work unpleasantly smooth, and took the "go" out of it.

The vote of thanks, on being put to the meeting, was very heartily received. Mr. Singer, in replying, said that the fact of being able to make an iron screen so light, and answering all the purposes of a screen or of a door, from the strength of the material, seemed to be a strong argument in its favour. The light was not obstructed, nor did it interfere with the architecture in any way, whereas a wooden or metal screen shut out nearly everything. With regard to the question of lacquer, it was simply a transparent varnish applied to the surface of metal while hot, and as long as this varnish remained, the metal kept its colour, but directly lacquer wore off the metal needed cleaning to get it bright. In a damp place the lacquer appeared much sooner than in a dry building, should be understood that lacquer did not improve the work in any way, and the better the work was carried out the more invisible it was, but lacquering greatly marred the effect of the work. As to the colour of bronze when exposed to open air, he knew of no substance with which could be coated to prevent oxidation. Bronze came a very beautiful colour, and he could refer to the statue in Bristol of William III. which had a fine natural patina upon it. It was the smoke of the City of London which caused our statues to go so dark in colour. He wondered this metal was not more largely used for architectural work, when an ornament was frequently repeated in metal could be made, and be repeated in bronze at less cost than if carved in most materials. Regarding repoussé work, bronze was quite as suitable a metal for its execution as brass, but copper was better than either, the latter being a metal which could be more readily worked, and could be raised to a higher relief without cracking. In reply to the question as to the ability of modern wrought-iron work compared to old work in that metal, Mr. Singer referred to the part of his paper dealing with the great qualities of iron.

The proceedings then terminated.

ARCHITECTURAL ASSOCIATION: DISCUSSION.—The ninth meeting of this Section was held at 56, Great Marlborough-street, on the 18th inst., at 7 p.m. The Chairman, Mr. W. Henry, presided. A paper on recent building legislation entitled "The Difficulties of Building Legislation," was read by Mr. J. Douglas Scott, F.R.S.B.A. The discussion which followed the reading of the paper was opened by Mr. Tyars, was continued by Messrs. Brodie, Beale, Gray, Stockdale, Taylor, Weymouth, Haggard, and the Chairman.

WAVERLEY STATION HOTEL COMPETITION.

MR. ROWAND ANDERSON, who was one of the invited competitors for the new hotel and offices for Waverley Station, Edinburgh, has addressed to the Railway Company the following paper, which sufficiently explains itself:—

"16, Rutland-square, Edinburgh, February 23, 1895.

DEAR SIR,—I duly received your letter of the 18th, written in reply to mine of the 16th inst., and I have to express my regret that you have not replied to the question put in my letter.

In your letter of the 14th you stated that the designs for the proposed new hotel and offices at Waverley Station had that day been carefully considered by the directors, and you intimated their decision on the plans submitted. On the 16th I wrote you asking if the directors had the competitors as to the methods of arranging and placing the building, the height of the building at various points, provisions for communication between different sections of the building, and other very important matters affecting the designs. The letter of instructions stated that the directors should be the sole judges of the designs, but did not suggest that the directors were not to adopt the only possible methods of forming a judgment.

The circumstances connected with the competition and the decision of the directors have been so extraordinary that I think an explanation is due alike to the competitors, the architectural profession, and the public; and it was in the hope that some explanation would be offered that I addressed you on the 16th. When architects enter into a competition, they know that only one competitor can be successful, and I should never cavil at the result where the designs submitted receive adequate consideration, and an honest attempt is made to do justice to the competitors. In the present case it is evident that these conditions have not been observed, and the competitors have the gravest cause of complaint against your directors. Apart from the competitor whose designs have been accepted, five architects of established reputation were invited to compete, and I am justified in saying that they all devoted much thought, labour, and expense to the preparation of their plans. I devoted to the work my own time and the time of twelve assistants, working extra hours for eight weeks, to the exclusion of other work, and I have no doubt the other competitors must have made equal sacrifices. It was freely stated to myself and to others that we might save ourselves the trouble of competing, as the result was a foregone conclusion; but I declined to believe that the directors of the North British Railway Company would ask professional men to give their time, skill, and experience to the preparation of plans, without the intention of dealing fairly with them in the award. It is now abundantly evident that the designs have not been carefully considered.

My plans were sent in only on the night of the 17th, and the decision was intimated on the 14th, on which day the designs were, as stated in your letter of that date, "carefully considered by the directors."

The directors had to examine and compare the elevations and plans of six sets of designs for a block of buildings to consist of a large hotel, railway offices, and shops, requiring to be adapted to an exceptional site, and it was part of their duty to the competitors to take proper means of satisfying themselves that the different designs were in conformity with the instructions issued, and that the actual conditions as to available space, height, and other important details were observed. In dealing with designs for a work of such magnitude, involving the consideration of the grouping and arrangement of hundreds of apartments, the directors ought, in ordinary course, to have had expert assistance and advice alike as to the more purely architectural quality of the designs and their practical adaptability to the purposes to which the buildings are intended to be put. The schemes of arrangement of the interiors alone (without speaking of the elevations) had taken weeks of thought and planning on the part of each competitor, and it was a matter of absolute physical impossibility for any one, even an expert, to master the details of the several schemes within the time that elapsed between the sending in of plans and the award.

Whatever process the decision of the directors was arrived at, it certainly was not reached by the only proper course of considering each set of plans in detail and comparing them with each other. Even if the directors were, unaided, competent to make such examination and comparison, it is quite evident that they did not attempt to do so.

As a practical man, acquainted with the difficulties of the task, I have no hesitation in saying that the directors, when they gave their decision, were necessarily ignorant of what they were dealing with beyond such vague ideas as they may have been able to form from a pictorial representation of the buildings, and I say that it is disgraceful to treat in such a way men who have attained a position in an honourable profession. The directors could have entrusted the work of designing the building to any person they pleased without going through the solemn farce of inviting competitive designs. Having invited competition, they ought surely to

have allowed a decent and sufficient interval for the adequate consideration of the designs to elapse before announcing their decision, instead of adding the insult of a public slight to the injury inflicted on the competitors, whose labour, thought, and outlay have been wasted.

The annals of architectural competition have many chapters of injustice, but I have never known of a competition conducted with such a contemptuous disregard of even the ordinary forms of fairness. I am quite aware that I lay myself open to cheap sneers about the disappointment of unsuccessful competitors, but I am satisfied that a piece of gross and wanton injustice has been perpetrated; and I shall not allow any fear of misrepresentation to deter me from offering my strong and earnest protest against what I consider injustice and insult to the architectural profession.

I request that you will submit this letter to your directors, and I remain, yours faithfully,
(Signed) R. ROWAND ANDERSON.

The Secretary, North British Railway Company.

THE ARCHITECTURAL ASSOCIATION SPRING VISITS:

CHELSEA POLYTECHNIC, TOWN HALL, AND FREE LIBRARY.

THE fifth spring visit to works in progress was paid on Saturday last to the Chelsea Polytechnic now in course of erection in the Manresa-road, Chelsea.

The visit was prefaced by an inspection of the Chelsea Town Hall* and Free Library,† at the former of which Mr. Brydon, the architect of all three buildings, kindly met the party. The general arrangement of the Town Hall is well known to our readers, and is a good example of straightforward planning. The hall itself is surrounded on all sides by a wide corridor, rendering it convenient of access; it is 80 ft. long by 50 ft. wide and some 40 ft. high.

The overdoors and panelling in walnut were much admired by the members. The carving is executed by Mr. Aumonier, who is also responsible for the sculptured work throughout the building. The Devonshire marble columns are also excellent examples of their class. Mr. Brydon took the members to the yards at the back of the building which abuts on some low-class property, but which presents a charming elevation in Mr. Brydon's best manner, and which, in the course of a few years, will be visible to the public, as a street is planned to pass through the property.

A visit to the library in Manresa-road followed, where the members had the additional advantage of being shown over by Mr. Quinn, the courteous librarian, who gave some very valuable hints as to the economical distribution and working of a public library. The elevation is in Monk's Park stone and Lawrence's bricks. A visit was next paid to the adjoining Polytechnic, lately won in competition, illustrations of which will be found in our issue for March 21, 1891. The building is practically a finished carcass as far as the present contract is concerned. The present building forms three sides of a quadrangle surrounding a central open space eventually to be occupied by an entertainment hall, bath, and gymnasium. The portion erected consists of basement, ground and first floor, the school of art being placed on the second floor centrally over the front. The basement contains the bricklayers', carpenters', plumbers', and engineering workshops. The ground floor is given up to the social side of the scheme, and consists of refreshment and reading rooms: the entertainment hall will eventually be on this floor.

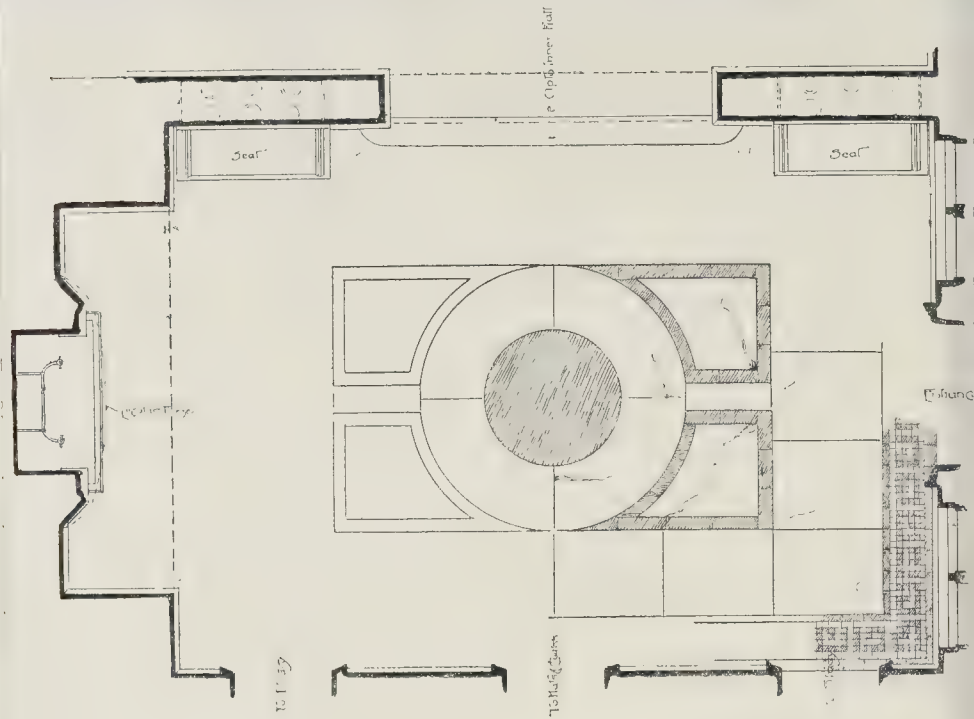
The first floor contains the class-rooms and lecture-rooms in connexion with the educational facilities which the Polytechnic will provide for.

Some interesting particulars were given by Mr. Brydon as to the general working and arrangement of the whole scheme, which will form when finished one of the most complete establishments of its kind in London. The front is in Portland stone from the Whitbed, and Lawrence bricks are used for the walling.

The three buildings visited form an interesting collection of the architect's work during the last ten years, and are a notable group of contemporary architecture. The members, who numbered about 120, thoroughly appreciated Mr. Brydon's courtesy and his explanation of matters of detail, and, on the motion of Mr. Banister F. Fletcher, accorded him a very hearty vote of thanks.

* See the Builder for May 9, 1885.

† See the Builder for June 5, 1889, and January 24, 1891.



Wrought-ironing Pavement

Scale 1/4" = 1' of Feet

Design for an Entrance Hall.

DRAWINGS FOR THE ROYAL ACADEMY.

EVERY year we call the attention of architects who send up drawings to our care, to the requirements of the Royal Academy, but every year we receive drawings sent up without the proper labels, for want of a little ordinary attention, which ought to be given. We will put it down once more. The Academy requires:—

1. A label hung to the frame by a cord, containing the title and author's name and address.
2. A similar label pasted on the back of the same.

3. A letter to the Secretary of the Royal Academy containing the same information.

If there is more than one drawing, each must be numbered, and the titles in the letter to the Secretary given under their respective numbers.

Only gilt frames are admissible.

We hope those who send us drawings will be good enough to pay attention to these requirements, thereby saving us much trouble which might easily be avoided.

Illustrations.

ARUNDEL CHURCH DECORATION.

IT may be remembered that the restoration of the nave roof of this fine old church was lately carried out under the direction of Mr. Geo. H. Fellowes Prynne, F.R.I.B.A., a notice of which appeared in our columns at the time. When the restoration was being carried out, it was proposed to decorate the wall space above the tower arch, which separates the portion of the building that is used as the parish church from the original sanctuary, now used as a private chapel by the Duke of Norfolk.

Our illustration is from a sketch design made for this purpose by Mr. Edward A. Fellowes Prynne, brother of the architect.

The scheme for the decoration represents Christ in Glory, surrounded by apostles and typical saints, with adoring angels and symbols from the Revelations.

Beneath the lower arch, on the wall blocking out the real sanctuary of the church, is represented the humiliation and death of Our Lord in his Crucifixion, with St. John and the Virgin standing by, this scene being in dramatic contrast to that of the Glory above.

In the spandrels over the top arch are the Symbols, from the Revelations, of the four Evangelists.

TEST COURT, CHILBOLTON.

THESE buildings, which are all but one labourers' cottages, were designed somewhat in the form of an almshouse to suit a particular site. They consist of one superior and ten four-roomed cottages. The cottages are planned upon the principle that three bedrooms can be secured with separate entrances and all with fireplaces. Thus if the occupants have children, the sexes can be separated, and if not, one room can be let to a lodger without inconvenience.

A model cottager's laundry is attached, but does not appear upon the plan.

The architect is Mr. W. D. Caroe, and the drawing was exhibited at the last Royal Academy Exhibition.

WROUGHT-IRON SCREEN, BURGOS CATHEDRAL.

IRONWORK is, perhaps, the most artistic development in Spain, one that is the least open to critical objection, and a form of art that cannot be studied on a similar scale elsewhere. If French cathedrals are purer, and Italian palaces more refined, than their Spanish imitations, at least, these lofty and magnificent Rejas cannot be paralleled elsewhere. The example illustrated closes the entrance of the Chapel of the Constable, which occupies the position of a Lady Chapel, at the extreme east end of the cathedral at Burgos.

If not, perhaps, the finest example of the Renaissance form of these grilles, it is probably unique in the possession of the strong buttress-columns on the inside; and is also a closer adaptation of the orders and metal work than

other examples which retain more of the character of a railway of metal bars.

S. Gil at Burgos contains the early form of these Rejas, which there consist of vertical square iron bars, set often diagonally, and framed by diagonal horizontals. The spandrels over the gates and the gate-leaves themselves, first received the ornamental treatment, the crestings soon became important elements in the design, and lastly, bars became the special feature. The baluster introduced by the Renaissance is, in a more elongated shape, of universal occurrence.

In the Transition occur perhaps the most admirable examples of pure metal treatment. In the chapel of Ferdinand and Isabella at Granada is a screen of metal bars treated in a legitimate decorative manner; the hood frieze is obtained in repoussé work, where the grotesques are obtained in repoussé work are full of fancy elaboration, possessing the lightness with strength that is the character of the material.

As regards construction, in the example given the figures are repoussé, and in duplicate, applied back and back with free edges. The entablature is thin, and, of course, hollow, mouldings being tied across by small flat bars. The ornaments are repoussé also, and attached to the frieze and the solid-looking plinth of gates. These gates are very heavy, but not fairly easily on large pivots. The bars are, of course, all hammered and chiselled iron; work is of a later date, and though these figures are closely imitated, the difference cannot fail to be noticed.

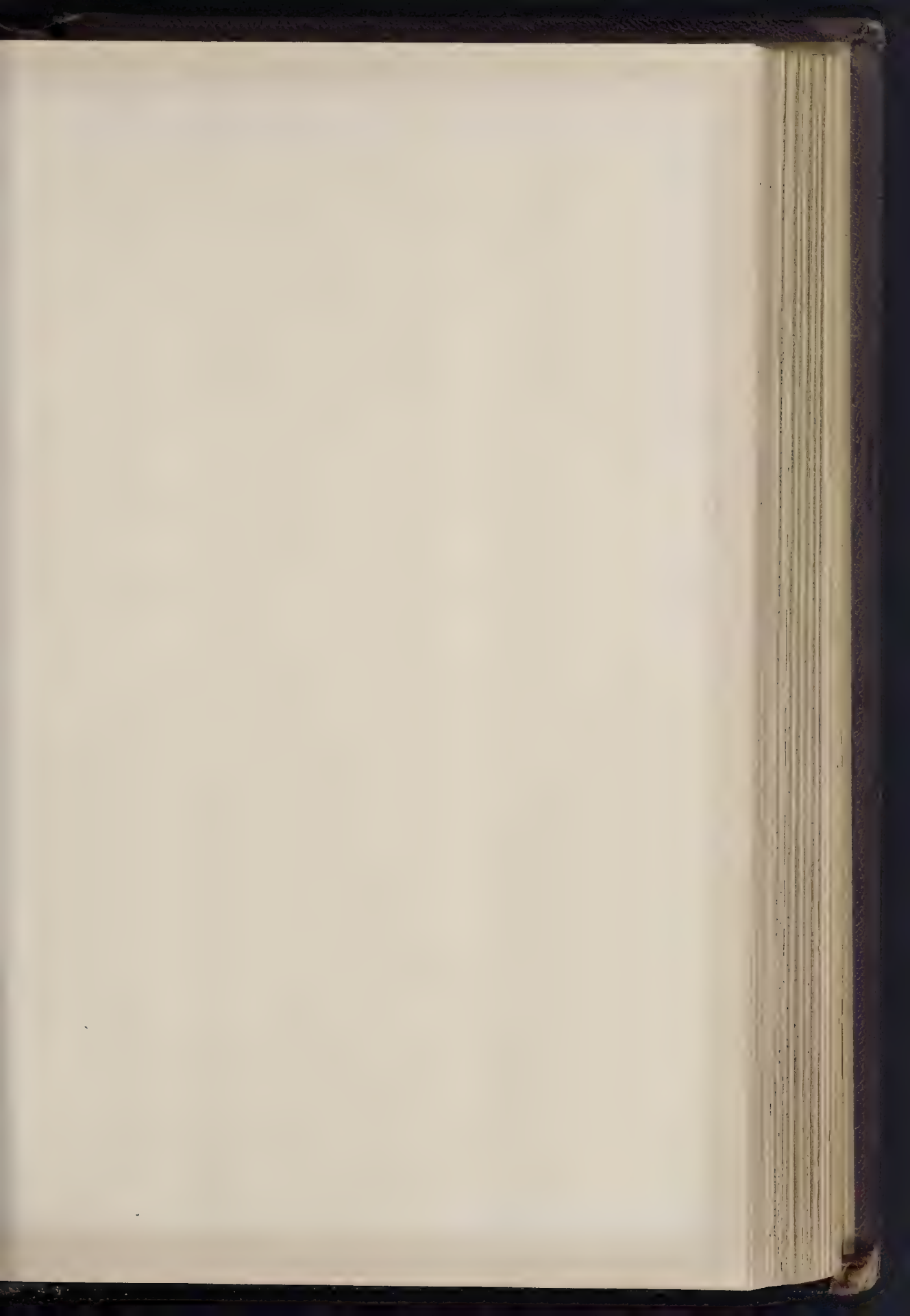
The artist's name, boldly inscribed, indicates the importance and value attached to the work.

A. T. L.

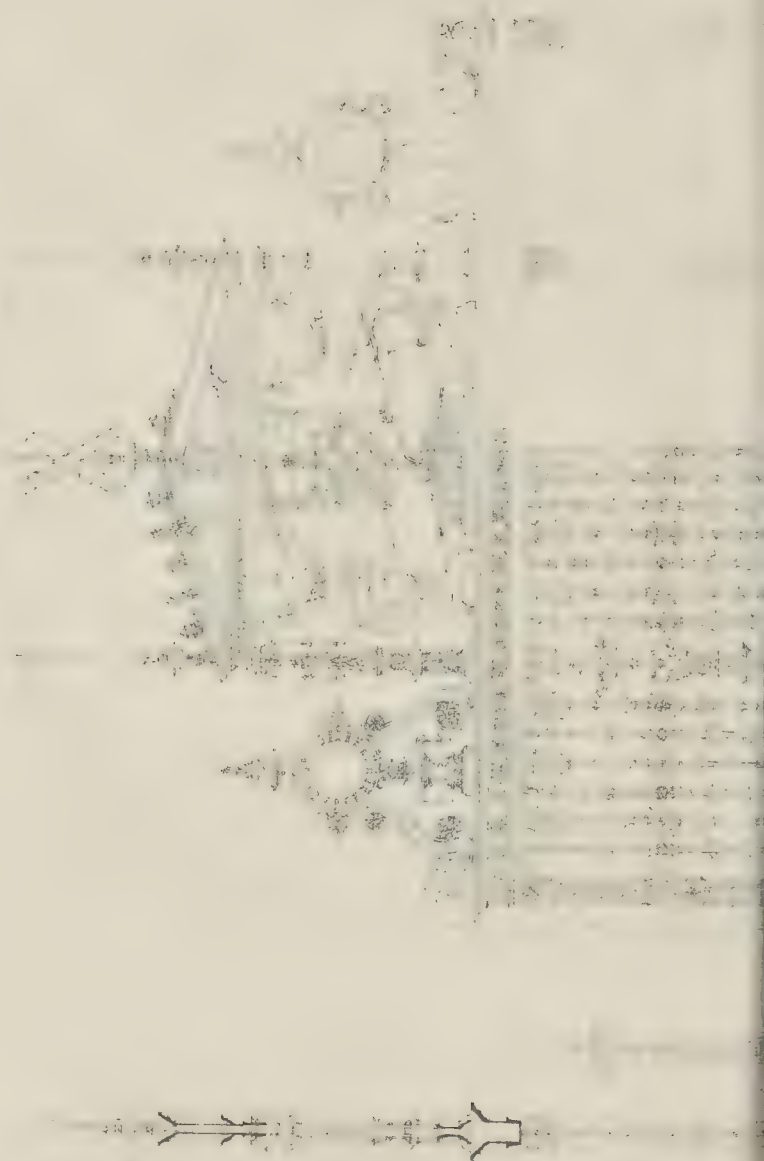
DESIGN FOR AN ENTRANCE HALL.

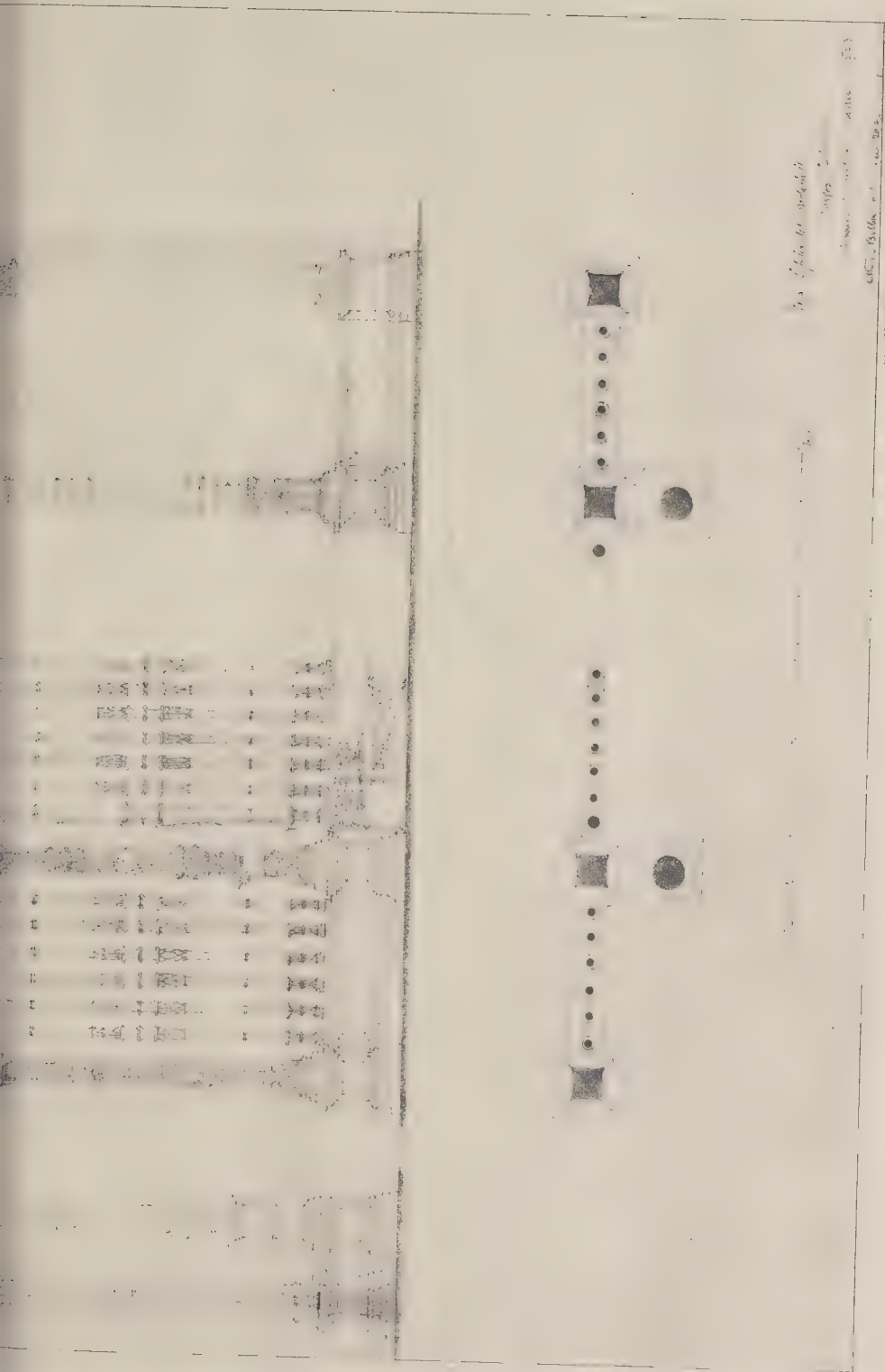
THE design which we publish to-day gave for its author, Mr. H. Seton Morris, the premium for the best set of designs in the University Architectural Schools of the Royal Academy.

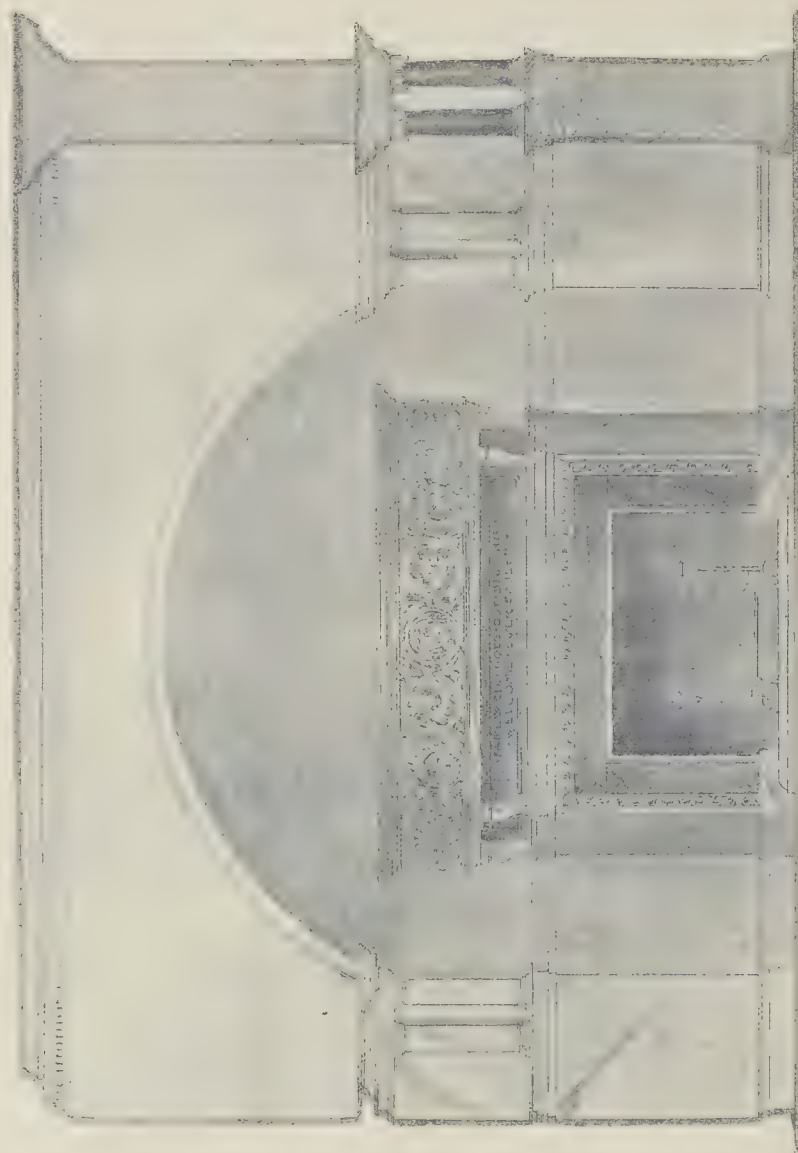
The subject set by the visitor, Mr. Norman Shaw, was "An Entrance-hall to a large Town House," and the endeavour of the designer.

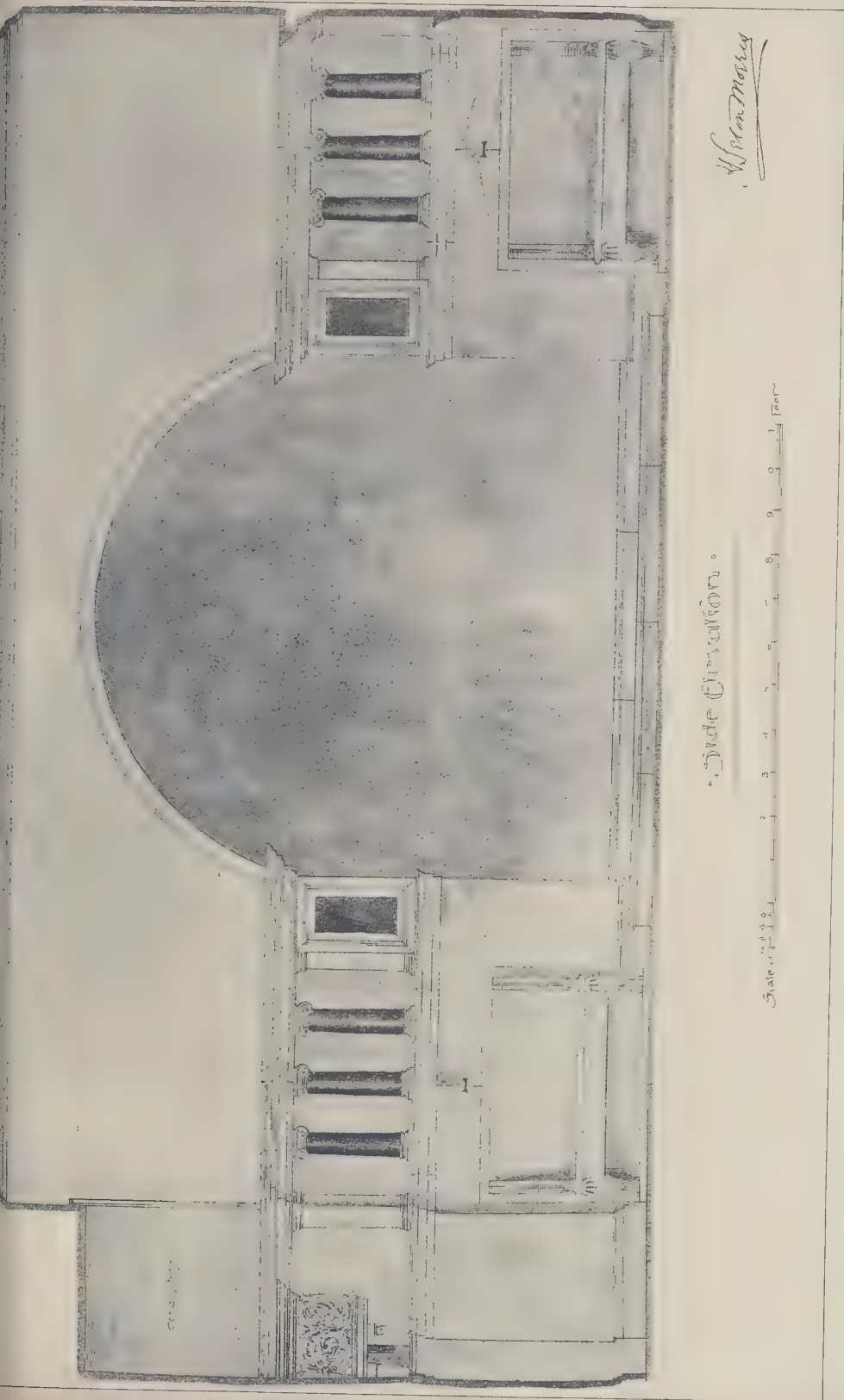


Laureo Cattedral : Conlita del Conlitolito.
Nofa in Wroglia Poro









• Duple Division •

Scale 1" = 10' 0" 1" = 20' 0" 1" = 30' 0" 1" = 40' 0" 1" = 50' 0" 1" = 60' 0" 1" = 70' 0" 1" = 80' 0" 1" = 90' 0" 1" = 100' 0"

DESIGN FOR AN ENTRANCE HALL BY MR. H. SETON MORRIS.

Prize Design, Upper Architectural Schools, Royal Academy

to convey the necessary dignity and repose, by relying on the beauty of proportion and the material employed, rather than upon carving or decoration.

The lower portion of the entrance-hall, including the pavement, is in black and white marble; the upper part is plastered, pains being taken to keep the arch-mouldings light and papery.

A vista of the central hall is obtained through the small colonnade, as well as through the archway.

Over the chimney-piece, which is in a recess at the end of the hall, a broad circular frieze relieves by the richness of its carving the severity of the main treatment.

CARPENTERS' HALL LECTURES:

COMPARISONS AND CONTRASTS IN ARCHITECTURE.

THE second of the series of lectures now being given at Carpenters' Hall was delivered on the 13th inst., by Professor Banister Fletcher, his subject being "Comparisons and Contrasts in Architecture." Dr. William Smith occupied the chair, and introduced the lecturer.

Professor Banister Fletcher, at the outset, said he thought that the theme of his lecture would afford an interesting subject, because it naturally led them to consider the geographical, climatic, social, political, and religious conditions of each country, and also their influence upon architecture. Dealing first with Egyptian architecture, the lecturer remarked that the Egyptians had plenty of stone and granite, and therefore their tombs, temples, and pyramids were built of these enduring materials. Their temples were not like our churches, which were places of worship for the people, nor like Greek temples, in which case the worshippers stood outside; but they were sanctuaries where only the king and priests penetrated. The earliest temples consisted of one small chamber with statue and altar, approached by a flight of steps, and they were generally considered as the prototype of the Greek temple. These smaller temples were afterwards enlarged by adding chambers for the priests, and courts, colonnades, and halls, all within a garden or court surrounded by a high wall. The erection of these temples was progressing during many centuries by means of continual additions. In this respect they resembled our own English cathedrals, as also in their disregard for symmetry in planning of parts in relation to one another, as in many of the later examples. The walls were immensely thick. In the more important buildings they were of granite, and the battering inwards of the walls of the pylons was indicative of strength. For the purposes of decoration, the walls, even when of granite, were generally covered with a fine plaster. The openings were all square-headed and covered with a massive lintel, as also the space between the columns. The style was essentially a trabeated style, and the arch did not appear to have been used. Window openings were seldom found in temples, light being admitted by the clearstories above, as in the earlier examples at Thebes, or over the low dwarf walls between the columns, as at Luxor or Philæ. The roofs were flat, and composed entirely of massive blocks of stone laid on to the columns. In the rock-cut temples the ceilings were sometimes slightly arched in form. The architectural character of these temples was striking and characteristic. The buildings decreased in height from front to back, and therefore formed a disconnected collection of various sized buildings, often built at different times, and in direct contrast to the harmonious whole of a Greek temple, which was all comprised within one "order" of columns, and which was distinctly, both in appearance and reality, one building. The face of the temple walls sloped inwards towards the top, which gave it a massive appearance. No columns, which were an essential feature of Greek work, appeared on the outside, but merely a massive blank wall crowned with a characteristic cornice, consisting of a large hollow and roll moulding. These walls in many cases were covered with hieroglyphics. Simplicity, solidity, and grandeur by impression of mass were the chief characteristics. Passing to Greek architecture, the lecturer said the Grecian style was essentially a columnar and trabeated style, in which the graceful column of stone supporting a lintel of the same material was the main feature. The arch was never used by the Greeks, who seemed—if they knew of its existence, as it was believed they did—to have strongly objected to the mixing of constructive principles. Their

architecture was a great advance on Egyptian, being remarkable for proportion. Proportion, in fact, was of the first importance to the Greeks; they built in truth, construction was apparent, no mixture of principles was allowed, and trabeated construction was always paramount. Therefore, in Greek buildings, simplicity, harmony, and unity were always to be found. The temples were all built for external effect, in contradistinction to Egyptian, which had all their beauty lavished on the internal courtyards and colonnades, which were not visible externally. The lecturer went on to deal with Roman architecture, which, he said, was founded more or less on the Grecian, although there was a great contrast, for the Roman used the arch as a constructive feature. Besides marbles (almost the only building material the Greeks had) the Romans had stone, brick, and terra-cotta. The main qualities of the people were conquest, wealth, and power, and these were well expressed in their architecture. There was less refinement in design and detail than in the Greek, but buildings were erected for more varied purposes. The lecturer next alluded to the early Christian or Romanesque period, and remarked that the duration of this phase of architectural development lasted from Constantine to Gregory the Great, or from about 330 A.D. to 600 A.D., but from the fourth to the tenth century also the churches usually went by the name of Basilican churches. Naturally, little money was at the command of the early Christians, and so they adopted the ancient basilicas, which were ready to their hand, as their places of worship, and in cases where they erected new ones, they were generally built from the remains of ancient Roman buildings in the vicinity, over the entrances to their former hiding-places or crypts. Thus in these early Christian basilicas in Rome they found columns with various ancient capitals, with shafts of various lengths, with or without bases, and made up by the addition of new pieces of stone, or with double bases. One great feature in early Christian architecture was the baptistery. The form was derived from the circular temples and tombs of the Romans. Originally it was only used for the sacrament of baptism, and until the end of the sixth century A.D., it appeared to have been a distinct building. After this period the font often came to be placed in the vestibule of the church. Having pointed out the different manner in which these baptisteries were treated in various European countries, the Professor next dealt with the Byzantine style, observing that its great contrast with Romanesque was the dome. Passing to Gothic architecture, he remarked that the object of the Gothic architect differed naught from the Pagan architect—in fact, it was curious to note how closely they worked. As examples he mentioned the Parthenon and the Gothic cathedral. The Pagan architect made the perfect enframement of a material god. The personification of the god they worshipped was there, and it only required to give that god a fitting house or temple. How different was the motive with the Gothic architect. There was no visible God to enshrine, architecture with him was to induce the people to look above for the God they were to worship. Grandly they did this by the upward line of the architecture. Every line, buttress, window, tower and steeple emphasised the aspiration heavenward. The lecturer proceeded to refer to the decadence of the Gothic style, and the revival of Roman architecture under the name of Renaissance, or new birth. He pointed out the great contrast between St. Paul's and St. Peter's and the pagan churches. The former appealed not so much to the Gothic ideal, but to the enclosing with the dome of heaven the space of worship. When he first entered St. Peter's he was greatly impressed by its majesty. It seemed to him architecture had achieved its grandest triumph in reducing man to insignificance compared to the God he came to worship, and in whose honour the temple was erected. The residences of this period, compared with those of the Egyptian and Grecian period, showed great contrast. He mentioned Hatfield, Blenheim, Chatsworth, and other mansions of England, and proceeded to refer to the Georgian period, when aspiration upon a grand ideal seemed dead; when the plain square house was the beau-ideal of an Englishman; and when the plainest barn-like church was all that was considered necessary for worship. These prosaic days, he said, were past, and there was again a desire to emphasise worship in some way at least commensurate with its founder, but difficult indeed would it be to rival such buildings as York and Norwich Cathedrals.

At the close the Professor was accorded a vote

of thanks for his interesting lecture, which was beautifully illustrated by lantern views.

COLOURED DECORATION OF ARCHITECTURE.

THE third of the series was delivered at Carpenters' Hall, on Wednesday evening, by Mr. J. D. Crace, Hon.A.R.I.B.A., whose subject was "Coloured Decoration of Architecture." Mr. F. C. Penrose, P.R.I.B.A., M.A., F.R.S., presided.

The lecturer, after referring to his practice of the art of coloured decoration having extended over more than forty years, said it could hardly be too often urged that a decorator stood in a very different position towards an interior which could claim some architectural effect to that which he occupied towards a room devoid of architectural treatment. In the latter case he was able to deal with it as so much surface, free from obligation except such as his client might choose to impose, or he might himself feel it desirable to adopt. But it was quite otherwise when he had to deal with a structure which presented characteristic forms and features expressive of constructive intention. He had then the obligation of carefully studying the architectural expression of the structure, of ascertaining which were the features which best assisted that expression, and then of weighing the proper amount of emphasis to be given by colour. All this part of his task was almost entirely independent of the consideration of any particular scale or scheme of colour. It was not at first a question of this or that hue. The first step was a complete recognition of how the values were to be distributed—apart from hue—and where the eye should be encouraged to recognise promptly the form; in fact, to decide what should be explained, as essential to the sense of stability, and what should receive the charm of interest or of mystery. The first and most necessary condition for the intelligent appreciation or enjoyment of any building was an almost instantaneous recognition of its structural form. It was this which produced what was rightly termed the quality of "repose" in a building—that most essential of all the qualities which constituted what was admirable in architecture; for architecture had for its object the production of stability, of matter wrought into beauty, and immovable. They must not think that repose was therefore only to be attained by omitting all ornament. Far from it. Many a noble building was full of detail, with no loss of repose. It was only requisite that the structural forms should impress the mind before the ornamentation. Then it mattered not what labyrinths of detail or what profusion of interest was provided; they but enhanced the beauty, not overlaying it. Here, therefore, began the colourist's responsibility. Apart from all question of colour harmony, he must explain what needed explanation, draw attention to that which was explanatory of the building itself, and be sure that he so handled his colours that none should tend to lead the eye away from the structural framework, nor to impress the mind with other matter before it had grasped the impression of stability. It was necessary to understand what a power for good or evil was colour in a building. Properly used it could help or supplement the architecture; it could do much to remedy omissions or to correct errors of proportion, or it might be used as a substitute for carving or mouldings. On the other hand, when applied without due consideration, be it never so harmonious in itself, it might entirely disturb proportion and repose, or subvert the whole intention and effect of a fine composition. The decorator, then, must be capable of appreciating the architect's intention. If he had these qualities he would not fail to secure attention for the important lines first; nor would he leave them isolated or detached from the larger spaces of the fabric. The spectator's eye must not only be led to the main lines, but must then be induced to traverse—not leap over—the intervening surfaces. This treatment of the spaces between the constructive features was the second step towards the complete expression of an interior. It might be carried out by moulded divisions or panelling, in relief; or it might be accomplished by colour; or again, it might be the result of a combination of relief and colour. But one reason why colour was so useful for explanatory treatment in interiors, and why relief treatment was often insufficient, was this: the admission of daylight was frequently such that the upper part of the building was entirely dependent on reflected, and very diffused reflected, light. Now, very diffused light did not afford such contrast of light and shade on moulded

surfaces as to make them easily intelligible. Colours, on the contrary, were best seen at their proper relative value in a diffused light. When, however, the sufficient explanation or expression of the constructive lines and of the intermediate spaces had been effected, there was yet another purpose for which colour was efficient. This might be described as "accentuation" or "emphasis," but, as in speech, so in architecture, the success of emphasis depended upon its being used sparingly and appropriately. In further remarks, the lecturer pointed out that it not infrequently happened that the keynote of the colouring was struck by some existing condition or circumstance. He observed that the decorator would, as a rule, better show his talent in appreciating and accepting these natural limitations, and making the most of them, than by setting them at defiance. Coming to the subject of the influence of colour decoration on the proportions of an interior, it was to be noted that besides the effect of advancing or retiring shades and tints of colour, it was chiefly in the placing of the contrasts that such influence was to be brought to bear. The comparative dimensions of height and width depended on the position of the strongest line of contrast. Again, much might be done with colour, in producing some impression of actual difference of form or section. It often happened that the flat ceiling of a square room, when plain, appeared to droop or sag in the centre. With colour it was quite possible to not only remedy that, but to make the flat surface appear to rise in the centre. On the other hand, with large unbroken surfaces of flat wall, a very useful office was performed by that framing of vertical and horizontal bands of colour or ornament by which the earlier painters divided their subjects, whether in fresco or mosaic. It would be seen at once that they restored to the expanse of wall that square and firm stability which the pictorial treatment had tended to weaken. As he had touched on mosaic, he would say a few words on that form of coloured decoration. Mosaic was the most magnificent and the most completely decorative of all the forms of coloured decoration. Perhaps, too, it was the one requiring the most judgment, the most discretion in its use. He spoke particularly of the gold-ground mosaic of which so many splendid samples remained in Rome, Venice, Ravenna, and elsewhere. Its best effects were obtained on curved surfaces; or if on plane surfaces, then on such as were not framed in by mouldings but were rounded off at the openings or external angles. Its great charm lay in the mysterious play of light on large expanses of curved or slightly rounded surface, where the metallic character of the gold was subdued or softened down sufficiently to modify the abrupt transition from metal to colour. It was quite possible to use mosaic for external ornamentation. But it required at least as much care without as within, or it might easily fail to assimilate with its surroundings. In any case, some distance was essential to seeing mosaic to advantage, and nothing could be more blindly inappropriate than the use so often made of it in this country during the last thirty years; he meant sticking bits of it, a foot or two wide, into the sunk panels of a reredos, level with the eye, and on a rigidly flat ground. Some of the noblest decorative work in the world had been done in "fresco"—both false fresco and true; for they must not forget that a very large proportion of what were known as frescoes, Italian and other, were nothing more than paintings in distemper. In country air and on a dry soil, fresco would last many a year. But the immense difficulties in its execution were not likely to encourage many practitioners, and a method unsuited for towns would hardly be worth pursuing in this country. Still, with very moderate protection the use of coloured decoration was quite possible, and might more often be used in external treatment than it was—at any rate on succoed buildings. The fresco paintings of the 13th, 14th, and 15th centuries were executed, almost without exception, with a view to decorative effect. Later on, when a more purely pictorial and less decorative system prevailed, it was usual to introduce such architectural features in the picture as would serve to connect it with the actual structural surroundings. Gradually, however, artists sought only to surprise the beholder by the pictorial excellence of that which was best when not purely pictorial, and within a very short period all sense of decorative fitness seemed to evaporate. It was no longer the object of the painter to beautify the architecture; his aim was to astonish by his artifices, and it was soon found that, instead of the decorations helping the

architectural expression, they positively interfered with it. In that impotence of control, that fatal desire to be free from limitations, which seemed destined to be the eventual ruin of all human aspirations, the true nobility of art perished. The best art of all ages had been that in which its own limitations had been frankly recognised. As decorative art thus rapidly deteriorated in Italy, where it had attained unexampled perfection, a very real, though less noble, variety was developed in France, and influenced all Europe. It might fairly be said that the root of its success lay in its strict determination to be decorative: that was to say, destined to beautify something other than itself. Whatever might be the feeling about the decorative art of Louis XIV., no one could doubt that its merit lay in the skill devoted to decorative purpose; and, though it was undoubtedly exuberant and pompous, as its patrons required it to be, this was not through any disregard of its real purpose. It was splendid and boastful, no doubt, but it was so in true alliance with the buildings to which it was applied, and it successfully performed many of the proper functions of decoration. But was it possible that now, at the end of the 19th century, under the mad impatience of control, the French were losing this talent for making beautiful? He confessed he suspected this to be the case. The art which abandoned its ideals and ignored its limitations could never become noble. In this country we had but fragmentary examples of coloured decoration: they were, indeed, rather evidences than examples, so far as colour was concerned. But we were rich in examples of a fine decorative instinct; at least, down to the time of the Stuarts. For decorative treatment of large expanses of surface nothing could beat the old Tudor panellings or the "strap" work of Elizabeth's time. Concluding, the lecturer said, the man who set out to decorate architecture had clearly one very plain duty before him. Before everything else it was his duty to do that which was best for the building. No elegance of ornament, no ingenuity of symbolism, no originality of colouring which digressed from this main purpose would find any justification in the result. For good or evil, colour was a power. Let it be wielded with care and with due sense of responsibility. Then, if the skill be there, he who wielded it should seem to possess, indeed, the magician's wand.

The lecture was illustrated with lantern views and several drawings, but Mr. Grace pointed out the difficulty he experienced in dealing with such a subject as he had chosen, from the impossibility of putting any illustrations in colour before a large audience. He was heartily thanked at the close by the Chairman, who remarked that no mention had been made of scagliolo work. In reply, the lecturer admitted the omission. He added that scagliolo work was a very legitimate treatment for external purposes and one that, perhaps, had hardly received sufficient recognition.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of this Council was held on Tuesday, in the County Hall, Spring Gardens, Mr. Arthur Arnold, chairman, presiding.

New Committees.—The first business that occupied the Council was the appointment of the standing committees. The following are the names of the gentlemen who will form the Building Act Committee and the Works Committee, respectively.—H. T. Banning, E. Bond, W. Davies, Lt.-Col. C. Ford, C. Jerome, G. B. Longstaff, W. H. C. Payne, G. H. Radford, R. Roberts, R. Spokes, R. Strong, H. R. Taylor, J. White, W. B. Yates. Works Committee.—R. C. Antrobus, G. Bicker, C. A. Barnes, J. C. Eastman, J. Dixon, E. B. Ellice-Clark, W. H. Fox, W. Goodman, E. A. Goulding, A. Hoare, Hon. L. R. Holland, A. Humphrey, Robert Lyon, H. H. Marks, Viscount Mountmorres, W. C. Steadman, H. R. Taylor, J. Thornton, H. Ward, E. White.

New Fire Brigade Station at Fulham.—The paragraph in the Fire Brigade Committee's report relating to the proposed new Fire Brigade station at Fulham, which we printed last week, page 205, gave rise to some discussion.

Mr. Westcott moved to refer the recommendation back to the committee, with an instruction that tenders should be advertised for in connexion with the work. It had several times happened that tenders had been received from contractors for amounts lower than those at which the Works Committee were prepared to do the work. Mr. Benchcroft seconded the amendment.

Mr. Fletcher, in supporting the amendment, said that in the case of certain works carried out by the Committee, the cost had been 52,000*l.*, whereas it would only have been 48,000*l.* if contractors had been engaged.

Mr. Ward said the figures given by Mr. Fletcher were misleading, because no allowance was made for extras, and there ought to be at least 10 per cent. added for extras on works contracted for. The Works Committee, on the other hand, were not allowed anything for extras.

Sir Blundell Maple, M.P., said he was sent to the Council pledged to see that the Works Department was made to compete with outside contractors, and he was determined to see the Department justify its existence.

Dr. White contended that they were bound to get the work done as cheaply as they could. The Works Committee should tender in the ordinary way, and if their tender was the lowest they should do the work, but not otherwise.

After further discussion the Council divided, when there voted for the amendment fifty-six, against it sixty-two.

The report of the Committee was then agreed to.

ARCHITECTURAL SOCIETIES.

EDINBURGH ARCHITECTURAL ASSOCIATION.—On the 16th inst, the members of the Edinburgh Architectural Association visited the village of Upper Liberton, and were conducted over Liberton House, the former residence of the Littles, the owners of the Barony, by Mr. G. Godfrey Cunningham, advocate, the present occupant. The attention of the party was directed, in the first place, to the ground plan of the house, consisting of two blocks of building at right angles to each other, with a circular turret or tower in the angle, these, together with another block or annexe, enclosing on three sides a small square courtyard, the fourth side of which was once shut in by a wall and a gate of defensive character. The special interest attaching to Liberton House lay in the fact that it belonged to a transition period, when defensive architecture, even in the case of structures without any claim to rank as a castle or fortress, had not yet been wholly abandoned, and when the state of society made it necessary to retain safeguards against sudden attack. Though disfigured externally by an alteration in the height of the walls, which had been considerably raised, and in the pitch of the roof, which had been depressed, the outlines of the original elevation were still clearly traceable. Lastly, the "Nelson room," a reconstruction of recent date, was explained to be an attempt arising out of structural considerations to introduce the half-timbered work associated, at least in Scotland, more often with the exterior than with the interior of the edifices in which it occurs. At the close of the visit, the President, Mr. W. W. Robertson, F.S.A.Scot., proposed a vote of thanks to Mr. Cunningham, which that gentleman duly acknowledged.

ARCHITECTURAL SECTION OF THE GLASGOW PHILOSOPHICAL SOCIETY.—The closing meeting of the session of the Architectural Section of the Glasgow Philosophical Society was held on the 18th inst., Mr. T. L. Watson, F.R.I.B.A., President, in the chair. Mr. Lewis R. Croskey, of Glasgow Technical College, read a paper on "Industrial Art, with special reference to the Training of Artisans." The art instruction given at industrial art classes, he said, must bear directly on trade requirements, and that could only be given by men having a complete knowledge of the trade. It could not be given by a teacher who had only a general knowledge of art matters. It must be given by one in close touch with the trade to which the student whom he is teaching belongs. In a discussion which followed, Mr. A. Lindsay Miller spoke in support of the view of the municipality helping trade technical schools. They could not in this country equal many varieties of German-made goods, and the secret of it was the splendid system of technical instruction carried on in special schools by the Government of that country. At the close of the discussion the annual business meeting was held. Mr. T. L. Watson was afterwards re-elected as President, as also was Mr. William Howatt as treasurer, and Mr. A. Lindsay Miller as secretary.

ARCHAEOLOGICAL SOCIETIES.

LONDON AND MIDDLESEX ARCHAEOLOGICAL SOCIETY.—At a recent meeting of this society, held at its new offices, the London Institution, Finsbury Circus, Mr. John Watney, F.S.A., presided. The Rev. H. D. Macnamara, M.A., Rector of St. James', Garlickhythe, read a paper

"Test Court".
Chilbolton, Hants.

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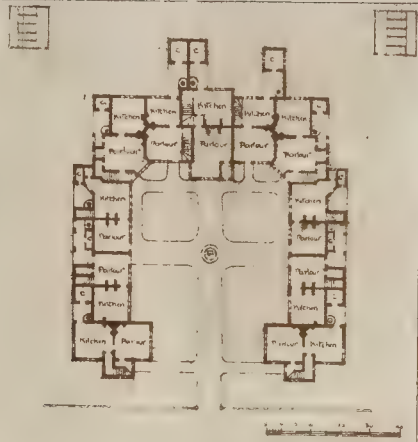


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on "The Records of his Parish;" these, he said, were gathered from the parish books of St. James, Garlickhythe, St. Michael, Queenhithe, and Holy Trinity the Less. In the last-named, neither the first visitation of the plague nor either the two subsequent ones was very fatal in the parish. Henry Machin, the diarist, was clerk of the parish church, and was referred to. The parish record of St. James, Garlickhythe, dates from the year 1535, and is one of the two oldest books in the City. Mr. Charles Welch, F.S.A., read a paper entitled "The Tackle House, and Fellowship Porters of the City of London," and said, one of the most ancient rights possessed by the Corporation was that of metage, and that while special provisions were made for the metage of coal, the right of metage of other articles was exercised by the Corporation through the Company of Porters, who were variously styled Billingsgate Porters, Corn and Salt Porters, and sometimes Fellowship Porters. They were never incorporated as a Company, but being servants of the Corporation, were regulated by orders made from time to time by the Court of Common Council. The Fellowship was said to have existed from the time of Edward I., but the regulations which were till recently in force for the government of the Fellowship were contained in an Act of the Court of Common Council, dated October 5, 1620. Before that date the body was governed by the Court of Mayor and Aldermen. The circumstances attending the disbanding the Fellowship of Free Porters, the forcible seizure of the Hall, and the discontent aroused by the delay in the distribution of the effects, are modern history, all this having occurred about twelve months ago. Votes of thanks to the readers of the papers closed the meeting.

ENGINEERING SOCIETIES.

INSTITUTION OF CIVIL ENGINEERS.—The Development of the Experimental Study of Heat Motors is to be the subject of the "James Forrest" lecture this year at the Institution of Civil Engineers, the lecturer being Professor W. C. Unwin. At the ordinary meeting of the Institution on the 19th inst., Sir Benjamin Baker, K.C.M.G., Vice-President, in the Chair, the paper read was on "Steam-Engine Economy: Condensing Engines," by Mr. Henry Davey, M.Inst.C.E.

CIVIL AND MECHANICAL ENGINEERS' SOCIETY.—On the 14th inst., at the ordinary meeting of the Civil and Mechanical Engineers' Society, a paper on the subject of "Passenger Lifts" was read by Mr. S. A. Court, A.M.Inst.C.E., Vice-President. Having referred to the earlier forms of passenger-lifts in use in England, the author gave details of various improvements lately introduced, such as the variable power hydraulic and the electrical systems, and gave figures to support his view that the latter has already shown by practical working that at even present prices the electric lift is a serious competitor with the hydraulic lift. Safety appliances and possible causes of accidents were then detailed, and mention was made of the recent fatal accident in the City. The author estimated that, on an average, fully ninety millions of passengers are carried annually in London alone, and pointed out that the percentage of accidents is extremely small. In the author's opinion, with the present prices for power, the electric system has been proved, for individual lifts, to be fully as cheap as the best form of variable power hydraulic lift.

Books.

The Scientific and Technical Papers of Werner von Siemens. Vol. II. Technical Papers. Translated from the Second German Edition. London: John Murray, 1895.

THIS volume contains the technical papers contributed by Dr. Ernst Werner von Siemens to various learned societies, and also descriptions of his inventions. As a record of the useful and active life of one of the most distinguished electrical engineers, it is an invaluable book. It is now more than two years since his death, yet his loss is still fresh in the memory of all the engineering world. That he was a shrewd man of business the firm of Siemens & Halske which he founded amply shows, yet he found time amongst all the cares of business and the fever of invention to study and write on many social and philanthropic problems.

To describe even briefly the many interesting inventions given in this volume would fill many pages; we shall confine ourselves to those which have attained a world-wide reputation.

In the early days of telegraphy great difficulty was found in working over long distances, as, owing to the leakage of current, the magnetism produced at the receiver was too weak to work the moving lever. As far back as 1848 we find that Siemens had invented a relay which allowed of automatic communication between neighbouring telegraph circuits. The note in which this is given is entitled "The Oldest Relay!" This is misleading, as Cooke and Wheatstone patented eleven years before this a relay to work the alarm in connexion with their five-needle telegraph. Of his other achievements in practical telegraphic work we may mention a dial and printing telegraph, the polarised relay, a system of duplex telegraphy, apparatus for localising faults in cables, and a battery of great constancy which is very extensively used.

The crowning invention of his life was undoubtedly the self-exciting dynamo, which he made in 1867. He seems even then to have had very clear ideas of the importance of the dynamo, and the kind of work to which it could be applied. He bitterly resented the attempt made by a few engineers in this country to give all the credit of the invention to Wheatstone and Varley, just as later on he resented the remarks made by a prominent English electrician disparaging his armoured cables. That he had good cause to be angry will be seen by the short notes published in this book explaining his case. The Siemens system of armoured cables is by far the most widely used in Europe. The insulating materials are cheap, and the possibility of laying the mains directly in the earth is of the greatest convenience.

The differential arc lamp which he invented was the first of the immense number on similar principles which have been patented since. Amongst other electrical inventions were meters, an electric hammer, a plough, lifts, and numerous improvements in connexion with electric traction; in fact, the first successful experiments on electric traction were made by his firm in Berlin in 1879, since then over 300 towns in the United States alone have adopted electric tramways. He employed electrolysis to obtain pure copper from ordinary commercial copper, which, as is well known, contains iron, arsenic, silicon, and many other impurities. By electrolysis a solution of copper sulphate and using the impure copper as the anode, almost all the impurities are left on the anode or deposited as mud at the bottom of the solution, whilst pure copper is deposited on the cathode. His classical experiments on the temperature of the electric arc are well known, he proved that it could melt the most refractory metals. The director of a Belgian company which worked zinc ore in Spain once asked Siemens for a machine that would separate the magnetic from the non-magnetic ores; the machine he made for them answered its purpose perfectly, separating a ton of ore per hour.

Of his numerous non-electrical inventions perhaps the best known is the pneumatic despatch, a method of transmitting small parcels of letters which is used in our own Post Office, and is also largely employed abroad. Others are an alcohol-meter, an anemometer, and an apparatus for the continuous measurement of the speed of ships. No wonder that Mr. Fletcher Moulton, Q.C., one of the jury at the International Exhibition of Electricity at Paris in 1881, said, after examining the marvellous exhibit of Dr. Werner Siemens, that he seemed to be waiting for the world to come up to him, to such a high degree of accuracy had he brought his instruments.

His military inventions are also given in this volume, and several very interesting general papers, the best known of which are "The Age of Natural Science," and "On the Possibility of Producing Food Stuffs by means of Electricity."

Electric Light Installations. Volume III. Application. By Sir David Salomons, Bart., M.A. Seventh Edition. London: Whittaker & Co. 1894.

In the first volume Sir David Salomons dealt exclusively with accumulators and in the second with apparatus used in electric lighting. In this volume various methods of working are given and many mechanical details which are interesting to both engineer and workman. A little previous knowledge is assumed on the part of the reader; he is supposed to be familiar with every-day appliances like cut-outs and switches and to know roughly the difference between an alternating and a direct current. It is an excellent book of reference for anyone who is in any way connected with electric lighting, all the information being thoroughly up to date. The rules and regulations

for the prevention of fire risks as issued by the Institution of Electrical Engineers are given as well as the rules of various other authorities for insulation resistance. The chapter on estimates will prove a very useful one, enabling an architect to check any specification for the electric lighting or wiring of a building. We rather wish that the remarks dragged in about the possibility of the existence of life being simply an electrical phenomenon had been omitted—they are singularly out of place in this useful little book.

Electric Lighting and Power Distribution. By W. PERREN MAYCOCK, M.I.E.E. Second Edition. London: Whittaker & Co. 1894.

THIS book is primarily intended for students preparing for the ordinary grade examination at the City and Guilds of London Institute. It is admirably adapted for this purpose, the syllabus on electric lighting and power distribution being followed. With the minimum of labour any intelligent student would be able with its help to prepare himself for the above examination. It will also prove useful for those who wish for short general descriptions of the latest forms of electrical apparatus. As a purely educational book it is of no great value, but this is not Mr. Maycock's fault, but the fault of the system which places a premium on knowledge which can be acquired in an easy-chair. It has many of the faults of a "cram" book—too great a partiality for uncouth words like myriaohm, decimeghm, megmho, &c., and a tendency to give ambitiously worded questions to be answered from the context as: "What is the difference between the systems of the Metropolitan and London companies? Give reasons." Of the sort of electricians this kind of thing turns out in a month or two we have had ample experience. On p. 99 there is a mysterious picture called "Fig. 58, Swinburne's N. Type Voltmeter," with a still more mysterious footnote: "N.B.—There is no fig. 59."

Electric Lamps and Electric Lighting. By J. A. FLEMING, M.A., D.Sc., F.R.S. London: The Electrician Series. 1894.

THE lectures given by Dr. Fleming to afternoon audiences at the Royal Institution on electric measurements, glow lamps, arc lamps, and distribution created a considerable amount of interest at the time, and he was well advised to publish them in book form. The industrial applications of electricity nowadays are so numerous that everyone should have some knowledge of the principles underlying them. The book is well printed and illustrated, and the information is imparted in an interesting and attractive form. Dr. Fleming has added another claim to the gratitude of those who have the interests of popular education at heart.

TRADE CATALOGUES.

MESSRS. YOUNG & MARTEN send a large and very elaborately got-up catalogue of gates, grate-tiles, ships' grates, kitcheners, &c., of which the practical portions are very useful, and the whole catalogue is a credit to the enterprise of the firm; but of the so-called ornamental grates, for the most part, the less said the better. It is a pity that large and wealthy firms cannot see that it would be worth their while, as a remunerative outlay, to get someone who is really an artist in metal-work to design such things as ornamental grates. Designs like most of those in this catalogue may be popular with builders and "the trade," perhaps even with the average Englishman, but they can never recommend a catalogue to architects.—We cannot say much more for Messrs. A. Boyd & Sons' "Registered designs of uncommon fireplaces"; the best are, as usual, the simplest, such as Nos. 170a, 152a, 427a, 435a, and 411a; these are pleasing, and are suitable specimens of metal-work treatment for the purpose.—The Volta Works (Leicester) send us their catalogue of electric bells, indicators, telephones, and electrical apparatus.—From Messrs. J. M. Bennett & Sons, Manchester, we have an illustrated list of sections of mouldings for cabinet-makers (Catalogue No. 1, Series H).—Mr. J. Stannah sends us an illustrated catalogue of hydraulic and electric passenger-lifts, with illustrations of construction and mechanical working, and remarks in explanation of various points in their working; a very useful catalogue.—The Safety Tread Syndicate send us their illustrated catalogue of non-slipping stair-treads, hydrant and manhole-covers, coal-plates, &c.—The Beeston Foundry Co. (Beeston, Nottingham) send us their illustrated catalogue of radiators, which contains

views and sections of various forms of radiator with some useful suggestions in regard to fixing and looking after them. The company have arranged an easy means of cleaning the inside of double radiators by providing for the temporary removal of the base, when the radiator can be thoroughly dusted and cleaned. In hospitals, as they observe, this is very important.

Correspondence.

To the Editor of THE BUILDER.

CARDIFF, SOUTH WALES, AND MONMOUTHSHIRE ARCHITECTS' SOCIETY.

SIR,—In your issue of the 9th inst., certain comments appear with reference to the action of this Society in requesting the Cardiff Museum Committee to invite designs in competition for the proposed new building in Park-place. Your unfavourable criticism of the Society's action leads me to suppose that in forming an opinion you have not had the advantage of an unbiased or truthful statement of facts, or such words as "very unprofessional and very discreditable" would never have found a place in your comments.

I enclose for your perusal the correspondence which has appeared in the local papers, which will explain itself, and from which you will see that the Memorial to the Committee contains nothing whatever which can be construed as dishonourable or reflecting discredit upon the Society. The Memorial runs as follows:—"That the Cardiff, South Wales, and Monmouthshire Architects' Society memorialise the Cardiff Museum Committee to the following effect:—'That unless they have already pledged themselves to any architect, they should invite a public competition for designs for the new Museum Buildings proposed to be erected in Park-place, the competition to be under the rules of the Royal Institute of British Architects.'

It should be noted that the proposed new buildings are no part whatever of the scheme for the extension of the Public Library Building, for which Mr. Seward is the architect, but are to be erected in another street nearly half-a-mile away, and the Corporation is under no moral or legal obligation to entrust the work to Mr. Seward. It cannot be denied that Mr. Seward, being a member of the Museum Committee, has given advice to the Committee, and may have been benefitted in return in certain ways, but this fact does not necessarily constitute him architect of the proposed buildings; and if what he terms an "honourably acquired engagement" be more than a mere self-appointment, the Committee, which must be considered a body of honourable men, is not likely to pass him by in consequence of the action of the Society, nor would any member of the Society wish it. This being so, Mr. Seward has exhibited very bad judgment and ill-feeling in forcing this matter before the public notice, and in making charges of so grave a nature against the members of the Society, thus seeking to injure its reputation. As President of the Society I consider it a duty, although a thankless one, to do my utmost to vindicate the honour of the Society, and to maintain that there has been nothing discreditable or unprofessional in the course it has taken; and I feel sure that you, Sir, in the interests of fairness and truth, will give the necessary publicity to my statement of the case.

E. M. BRUCE VAUGHAN.
Cardiff, March 15, 1895.

THE TRADE UNIONS AND THE EDUCATION CONFERENCE.

SIR,—Will you permit me through your columns to show how the difficulty at issue in the above question strikes an outsider who has followed the Conference with interest.

1. While agreeing in the main with Mr. Fleming's letter and the speeches of like tenor reported by you, I would venture to suggest that it is not altogether fair to attribute to the Trade Unions the raising of a political issue by this action in retiring from the Conference. The question was one of status. The status of the Free Labour Association considered in its bearing on education, and the status of the Trade Unions similarly regarded in the event of their being put on a par with any other body that might appear to be wanting in genuineness.

2. The point raised by Mr. Verdon and the instance he quoted, seems to me to fully justify the determination of the Trade Unions to have nothing to do with a body open to this imputation.

3. While, however, agreeing with them on the principle, and also in the desire to bring the question to a head, I consider that in their method of going to work they were quite wrong. Their representa-

tive, as well as the Free Labour representative, came to the Conference by invitation, and, as Mr. Mountford rightly observed, they should have sent in a notice of their intention to retire before hand.

4. While, however, criticising the Trade Union representatives for their method of action as guests, I hold that the conveners of the Conference were quite as much to blame in their action as hosts. It was they who were responsible for the genuineness of the representation at the Conference. If the facts adduced by Mr. Verdon are true, it would seem to imply an almost culpable ignorance on the part of the architects whose duty it should have been to discover beforehand the status of the Free Labour Association and its claim to representation on educational questions.

5. While, therefore, expressing the hope that the Trade Unions will recognise their error of method, and continue to act on the Conference, we architects may surely, not unwisely meet this opportunity of looking more carefully and with less bias into the fundamental difficulties that underlie Trade Union questions. Whatever their defects and limitations may be, it is only through the Trade Unions that we can solve the educational problems with which the Conference is trying to deal. We should, therefore, it seems to me, not only meet them on the ground, but we have sought to do, unreservedly and frankly, but, by sympathy and study of the difficulties that most nearly concern them, avoid any suspicion of unguineness, or even covert hostility.

C. R. ASHBEER.

SIR,—As a constant reader of the *Builder* and one who takes a deep interest in educational questions generally, and in technical education in particular, permit me to offer a few remarks on the above question, and the deplorable action of the trade unionists in withdrawing from the Conference. Should they persist in staying away, it will be nothing short of a disaster, as the only way for a conference of this sort to produce any result of good is for its basis to be as broad as possible, so as to be in touch with every phase of every difficulty that is likely to arise. Trade unionists are identified with the practical aspect of the building trade, and the architects with the theoretical; each of them is intimately acquainted with certain difficulties that present themselves to the other, and an opportunity has at last been offered for these two sections to have a free interchange of opinions on a basis that should be acceptable to both, it is to be hoped that the present difficulty can be surmounted, owing to the important issues at stake.

Now, as a sort of connecting link between the two sections, I sympathise with both, owners and the turn things have taken. I do hope that the Trade Unionists will, on reflection, reverse their previous decision, and allow their delegates to return, in order to continue a work that is pregnant with possibilities for good. I hope that the conveners of the Conference will also reconsider their decision in one particular. According to your last report, some twenty-three delegates, representing about seventeen Associations, were present, and it surpasses my comprehension to understand by what process of reasoning the Builders' Foremen and Clerks of Works Association has not been invited. It requires a good deal of ingenuity to pass them, as both of them fall in quite naturally between the architects and workmen, and surely no one would seriously say that they have been left out because they have no men qualified to take part in such a Conference; as an accident, it is untenable, as a design, unjustifiable.

JOHN DAVIES.

** We have already said that we think the Builders' Foremen and Clerks of Works Association should have been invited. We believe the omission arose mainly from a desire to avoid complicating the discussions by extending them too much. But the Association in question certainly has a special claim.—ED.

THE APPOINTMENT OF RURAL DISTRICT COUNCIL SURVEYORS.

SIR,—I should esteem it a favour if you would allow me space in your next issue to say a few words as to the appointment of surveyors under the Local Government Act, 1894. I quote first of all a case in point.

The Hailsham Rural District Council require a surveyor; their district comprises eleven parishes, with an area of 55,128 acres and a mileage of from 250 to 300 miles of district roads to superintend and maintain; the surveyor is to bear the expense of everything connected with his office, not to be engaged in any work of a private nature, to provide means of getting about his district; this means he must keep a horse, which, putting it at the lowest, will cost him 20s a year, he must also find a guarantee in a sum to be fixed by the Council for the faithful discharge of his duties, and for all this he is to be paid annually the most magnificent sum of 120l., less the 30l. for horse 90l., equals 17 14s. 7d. per week, which is less than the wages of a bricklayer per week, and considerably less than a foreman of scavengers would receive; and for this sum he is bound to be answerable for the proper maintenance of, and the construction of sewers, culverts, bridges, highways, and everything vested in the Authority.

After men have been at the expense of receiving an education, at the expense of being articulated, making themselves qualified as sound practical men for such offices, it is a disgrace to offer them such salaries.

I think that everybody knows that if you pay one labourer 4jd. per hour and another 5d. per hour, you will get considerably more and better work out of 5d. per hour than 4jd. per hour, and so it is with surveyors.

Medical officers and sanitary inspectors are partly paid by the Local Government Board; why not the surveyors? And why cannot their salaries be entirely fixed by the Local Government Board? It appears that many Authorities do not understand the value of a practical man, and the very responsible position he holds, or they would never offer such mean salaries.

I have in my mind a Rural District Council who pay their surveyor a good salary (they are few and far between), and treat him as a good, practical man; not only does the Authority benefit, but the rate-payers at large.

THOS. PHILIP BAYLIS, Assoc. M. Inst. C.E.

SEWAGE PRECIPITATION.

SIR,—I should be very much obliged to any reader of your paper who could give me the names of any towns that are, to his knowledge, successfully disposing of their sewage by means of precipitation.

F. W. KINNEIR TARTE.

The Student's Column.

BRICKS AND TERRA-COTTA.—XII.

DURABILITY OF BRICKS.

TAKEN as a whole, bricks are more durable than stone, and that is not to be wondered at considering the peculiar effects of hard burning in really good bricks. If anything of an easily perishable nature exists in the raw clays, or in the ingredients added to them in the process of manufacture, it is frequently so much modified by the partial fusion and agglutination consequent on hard burning, that it is no longer affected by weathering agents. In the last article we quoted a case where a large quantity of lime being present in the clay of a certain brick-earth, instead of being regarded as a nuisance by reason of its weathering propensities, was actually turned to account, making rather better bricks than usual on being properly burned in intense heat. It would, therefore, seem that the durability of bricks is largely bound up in the degree of heat to which they have been subjected in the kiln. Given the same raw material it is possible to produce either an exceedingly durable brick therefrom, or the reverse. And this is perfectly true within limits. We must remember that certain raw earths may be burnt up to practically any heat without actually melting, but there are others, capable of producing bricks far above the average quality, which would twist and warp during firing unless the latter were kept within certain temperatures. The kind of earths employed in the manufacture of the average building brick have to be burnt with much circumspection, otherwise they would not only become deformed in the process, but it would be impossible to produce uniformity in colour. Under these circumstances we note that certain deleterious ingredients are not rendered proof against the action of the weather, as they are not sufficiently burned to cause them to be incorporated or to enter into chemical combination with other compounds in the brick.

The durability of a brick is often modified by the particular kind of fuel used in the kiln; of course, we are not speaking of muffled furnaces where the materials might be said to be baked rather than burned, but to kilns properly so-called. We do not intend at the present time to enter into a disquisition concerning the nature and properties of divers kinds of fuel; it may be pointed out, however, that certain chemicals given off during combustion are apt to affect the ingredients in the raw earths and to bring about results by no means contemplated in the first instance. When ordinary pit coal is used, the sulphur driven off, derived from iron pyrites, is usually considerable. Unless the manufacturer possesses sufficient knowledge of chemistry and metallurgy, it behoves him to accustom himself to using one particular class of coal. A great deal has yet to be learned concerning the precise changes brought about in the kiln; in time to come more advantage will be taken of the special properties of different fuels than is done at present. The preparation of the raw earths will be carried out in view of the changes to be wrought in them by the employment of certain fuels as much as by the interaction of their ingredients upon one another. Fuels

chemically prepared to bring about definite results will assuredly be extensively used by the makers of high-class bricks. Whilst speaking of this matter, we may note that in 1887 experiments in burning bricks with oil as fuel were carried out by a Chicago firm. The oil was tried with kilns containing over a quarter of a million bricks, and it was ascertained that the same earths burned more perfectly and with greater uniformity in colour with the oil than with coal. Moreover, the ingredients became better agglutinated, and it was officially stated that the product was more durable. Further, but this applies, of course, more particularly to the United States, the use of oil enables the brick manufacturer to dispense with considerable high-priced labour at the kilns, and the time of burning is shortened by about two days.

Perhaps the greatest influence brought about by burning in regard to the durability of bricks is in the method of increasing the heat. After the moulded and partially dried bricks are built up within the kiln a slow fire is lighted to further dry them, as the fire must be quite dry (or as near as may be). Now, it frequently happens, as remarked in another connexion on a previous occasion, that the bricks are slightly cracked during the air-drying process. If these are subjected in the kiln, at first, to any higher temperature than that of the open air from which they have just been brought, the cracks are sure to become wider. The heat must be very gradually applied, not by fits and starts, as is done apparently in some brickyards we have visited. It is commonly understood that a slow fire has to be kept up until moisture has ceased to rise from the kiln, and then it is believed to be the correct thing to arrive at a very high temperature as soon as possible. A very little consideration will show that this is by no means the proper way to burn bricks. From the moment they leave the moulder's hands, or the machine, they commence to dry—i.e., to part with moisture. The latter exists in the earth in two conditions, between the minute particles, and in them; in other words, moisture exists interstitially and in chemical combination. Neglecting the latter condition for a minute, we note that moisture in the former case renders the clay plastic—it acts as a lubricant by which the particles are urged to slide over each other on the application of force. It is this which primarily disappears when the brick is dried and the moisture in the outermost portion of the brick goes before that in the inside. In the drying it will thus be noted that unequal contraction is produced, and great strain, under the most favourable conditions, is set up within the brick. If the drying takes place too rapidly, the energy developed by the straining overcomes the adhesion of the particles along lines of weakness (produced by the same action) towards the exterior of the brick, and the effect of the rupture becomes apparent in the creation of cracks. It is impossible to prevent the exterior from drying before the interior, though we can retard the progress, and practically remove all traces of the conflict by drying very slowly. The gist of what has just been remarked is common knowledge with most brickmakers, but it is singular that so few of them carry that knowledge from the drying sheds into the kiln. The first application of artificial heat leads to the creation of a much higher temperature than is found outside, and the brick which may have been properly air-dried at first begins to "sweat," and greatly-increased unequal contraction now makes thin cracks. We need not follow the burning throughout; sufficient has been said to show the necessity for the very gradual application of heat during the initial stages.

When practically all the interstitial moisture has disappeared, the firing should yet, for a time, be very gradual, and for another reason. The brick has now become materially contracted as a whole, in size; shrinkage has slowly taken place up to this point. But it now commences to expand; the expansion must take place slowly, not suddenly, else cracks will be formed from that cause, especially in the coarser qualities of brick-earths. When great heat has been attained, the chemical changes taking place may lead to some of the earlier formed cracks being filled up, or re-cemented by agglutination, or partial fusion; though it may well happen that by the same process the minute breaches may be widened—depending on the homogeneity and thoroughness of grinding of the earths in their preliminary preparation. Assuming, however, that the bricks have passed through the ordeal up to the present stage in a thoroughly satisfactory manner, there is yet another and a

worse enemy lying in wait for them, capable of forming larger cracks than either of the foregoing. We allude to the cooling process. Subjected to in many instances extremely high temperatures, the bricks, at the moment the burning is completed, are much expanded, and they must be very slowly cooled, or contraction will take place too rapidly, and cracks, which must ultimately remain in the bricks, are formed. The method commonly adopted in cooling is to let the fires go out too suddenly, and the comparative freedom from cracks in bricks turned out by the best manufacturers is due to the circumstance that the makers are not afraid to use a little extra fuel to finish the burning properly.

Before stating in what way cracks in bricks affect their durability, as distinguished from their strength, we cannot help calling attention to the deleterious effects consequent on stamping the maker's name, or some device as a trademark, or indenting the brick in any way. We have no hesitation in saying that without these advertising media, or without the hollows, many bricks would be better in quality, certainly fewer cracks would form. We exclude from these observations bricks from certain earths of a superior kind from which terra-cotta, pottery and fire-bricks are made—our remarks more particularly apply to ordinary kinds. During the past few months a great number of different kinds of bricks have been forwarded to us by manufacturers, and it is quite easy to see, from a careful inspection of them, that the devices indented have, in many cases, formed points from which minute cracks radiate. From other surfaces of the same bricks not possessing cracks of any importance, or, at any rate, from their not being disposed in radial aggregates, there seems to be no doubt that the most dangerous class of cracks, as affecting durability of the material, are induced to form by the indentations referred to. In the case where bricks are broadly channelled, or where one surface is hollowed out, it is interesting to note the formation of cracks in the depths of the hollows following along definite lines of weakness. It is quite evident from a mathematical consideration of the position of these cracks with reference to the shape of the hollows that they arise in the majority of cases from too sudden cooling; and in this particular instance our remarks apply not only to ordinary building bricks but to those used for paving and as firebricks, excluding only those which are vitrified.

We have promised not to say much concerning the commonest class of bricks, but we cannot help remarking that in these and in those of a rather better character in which small coal, &c., is introduced to assist in "thoroughly" burning, the strain set up locally, caused by unequal contraction and expansion about small pellets of coarse material and around the pieces of breeze, is such as to lead to the formation of large cracks.

Now, then, as to how far and in what way cracks in bricks affect their durability. The problem is not quite the same as with stone, and it will be interesting to note the differences. By some it will be taken for granted that the development of cracks is a bad sign. We are far from saying that they denote excellence of manufacture, but the precise amount of damage they lead to in the weathering process is by no means regulated by either their size, disposition, or comparative abundance, in many bricks. If we examine, under the microscope, a piece of building-stone, say a limestone, or granite, we observe that any cracks that may occur end very gradually in the stone, and that the micro-structure of the material at the end of a crack does not differ from that of the rest of the stone. If we now examine the termination of cracks in bricks, we see that one of two things happens, either the structure is the same as in other parts of the brick, or a sort of belt or collar of substance better agglutinated and fused together than in the body of the brick, makes its appearance. The practical value of this discovery—for it is the first time this peculiarity has been noticed—lies in the circumstance that whereas in stones, and certain bricks of average quality, cracks once begun are induced to continue opening in the same direction, in other and better class bricks cracks are prevented from so continuing because a barrier has been thrown up to arrest their progress. The expansion of ice in cracks of bricks, during cold weather, would in the former case tend to the further development of the cracks; but in the latter the action would be considerably impeded, or entirely arrested. We have observed these two structures in one and the same brick, but rarely; and although we have not yet submitted the matter to practical

tests we are at present of opinion that those cracks terminated by an agglutinated belt or zone were produced prior to the advent of the most intense heat to which the bricks were subjected in firing, and those not thus terminated were produced in cooling. It would appear as though the sides at and near the ends of the cracks in the former case were re-fused by the introduction of greater heat along the more open part of the cracks. We have not observed this re-fusion or agglutination where the cracks were induced to form by indentations on the surface of the bricks. This is another instance of the application of the microscope in testing the durability of building materials.

GENERAL BUILDING NEWS.

CORPORATION SWIMMING BATH, BRIGHTON.—On the 12th inst. the Brighton Corporation Swimming Bath was opened by the Mayor, Alderman W. Botting. The bath, which has been erected and equipped at a total outlay of 8,000*l.*, has been built in the Corporation stone-yard at the bottom of North-road, adjoining the North-road Slipper Baths. The building covers an area of 138 ft. by 61 ft., and is approached by a red brick entrance and lobby, in the mosaic flooring of which is worked the borough arms. The water surface of the swimming-bath measures 120 ft. by 30 ft., and the water ranges in depth, by a gradual slope at the bottom of the baths, from 3 ft. 0 in. at the south end to 7 ft. at the north end. The bottom and sides of the bath are paved and lined with white glazed bricks and tiles. The platform around the bath is of mosaic paving. The east and west sides are occupied by 65 dressing boxes. The woodwork is of pitch-pine, and the front of each box is enclosed with a half door and a terra-cotta coloured sliding curtain. The walls of the building are lined with white glazed bricks, carried to a height of 4 ft. 6 in. above the gallery floor, where they terminate with a band of blue bricks. Above this band the walls are finished with white Suffolk bricks, the piers and arches being of red bricks. The galleries, approached by staircases near the entrance, extend round the north, east, and west sides of the building, and are capable of seating upwards of 500 persons. Like that of the dressing-boxes, the wood-work is of pitch-pine, and the front is fitted with an iron-work fencing. The roof is carried upon ornamental iron principals, and lighted by a lantern roof extending along the full length of the building. The artificial lighting is by electricity. The water of the bath is heated by steam on the Roshier system. On the east side of the building are superintendent's office and stores, ladies' room, lavatory, gentlemen's room, and shower-bath. The work has been carried out under the supervision of the Borough Engineer and Surveyor (Mr. E. J. May). Messrs. Longley & Co. were the builders. The skylight over the bath was glazed on Messrs. W. E. Rendle & Co.'s patent "Invincible" system.

PROPOSED NEW POLICE OFFICES AND BOROUGH COURT, HALIFAX.—A report of the Halifax Borough Engineer, Mr. E. R. S. Escott, shows how it is proposed to adapt the Infirmary buildings—the site of which contains an area of 4,300 yards—to the purposes of a police-station and court-house. The plans include the provision of magistrates' public and private rooms, magistrates' clerks' offices, rooms for solicitors and witnesses, chief constable's office and charge rooms, detectives' offices, cells, police parade room and recreation hall, parade yards open and covered, stables, and van shed. It is proposed to utilise the ground and first floors only of the main Infirmary buildings, and not any portion of the Assembly Rooms.

NEW HALL, NEWPORT.—The Tredegar Hall, Newport, was opened on the 14th inst. by the Right Hon. Lord Tredegar. The new building, which is to be used as a concert and assembly-room, was erected from designs and under the superintendence of Messrs. Habershon & Fawcner, architects, of Newport and Cardiff. The hall affords sitting accommodation (inclusive of the orchestra and platform) for 1,350, with standing-room for 400 in addition. In order to get the accommodation required, the architects introduced an upper balcony, with corridor right round the hall. The balcony front was constructed by Messrs. Baker & Co., of the Westgate Iron Works, Newport. The warming is effected by hot water on the low-pressure system. The corridors and main stairs are fireproof throughout. The builders were Mr. George Wilkins and Mr. George Martin.

EXTENSION OF ST. MARGARET'S CONVENT CHAPEL, EDINBURGH.—During the past eighteen months the chapel of St. Margaret's Convent, Whitehouse, Loan, Edinburgh, has been undergoing enlargement, which has just been completed. The result is the addition to the former structure (which consisted of a choir and side aisles) of a new sanctuary or chancel with hexagonal apse, a vaulted crypt chapel beneath, a lady chapel, two sacristies, and a new organ loft. A number of memorial stained glass windows have been introduced into the enlarged edifice. Occasion has also been taken to erect in the extended church a new altar. The tabernacle, with gilt door jewelled, shows prominently in the centre of the altar table. Both altar and tabernacle are of

white alabaster. The gradus or step on which the tabernacle stands and the super-altar with its cornice are likewise of white alabaster. On the extremities of the super-altar stand small clustered shafts, from which spring cusped arches, joining on the one hand the side wall of the apse, and on the other forming connexion, in the shape of a flying buttress, with the reredos, which is placed against the back wall of the apse. Angels standing erect on the clustered shafts hold in their hands shields bearing the instruments of the Passion. The throne, which forms the central feature of the reredos, rises from the carved figure of an angel. Above this, canopied work with cresting, flanked by buttresses, and rising into spirelet forms and pinnacles, complete the treatment. The throne is flanked on each side by sculptured panels in high relief, the subjects represented being again angels in various adoring attitudes. Canopied work crowns this part of the design also. The whole work has been designed by and carried out under the personal supervision of the architect, Mr. Archibald Macpherson, of Edinburgh. The sculpture work was executed by Mr. William Vickers, Glasgow; whilst the metal work of the tabernacle was executed by Messrs. Hardman, Powell & Co., Birmingham, also from the architect's design.

FOREIGN AND COLONIAL.

FRANCE.—The Council of Directors of the 1900 Exhibition have this week examined and adopted in its main lines the scheme of M. Bouvard for the general arrangement of the Exhibition.—A new Hippodrome is shortly to be constructed in the Boulevard Maiesherbes, from the plans of M. Yvon, architect.—The new Sceaux Railway is to be formally opened in April. The work has been carried out throughout under the direction of M. Brosse as engineer.—The following young architects have been selected by the Académie des Beaux-Arts to take part in the Prix de Rome competition: MM. Dusart, Duquesne, Bigot, Murser, Patouillard, Pille, Umdenstock, Auburtin, and Lamarequer.—The Municipality of Paris is about to open a competition for the best methods of warming the horticultural establishments which M. Formigé has been commissioned to erect at Boulogne.—The Société Académique d'Architecture de Lyons has chosen for its two competitions in archaeology and architecture this year the following subjects:—"The decoration of the Place Bellecour at Lyons," and "The state of the Pont de la Guillotière at Lyons in the reign of Henry IV., from 1600 to 1610."—The premium in the competition for a monument to President Carnot at Fontainebleau has been awarded to M. Peynot. The design shows the bust of the arms of Fontainebleau; at the foot of the monument a seated figure representing France, clad in a robe of regretted president, on a stele ornamented with the mourning, and holding a flag. The portrait bust will be in bronze, and the rest of the monument in stone. It will be placed in the place opposite the Marché au blé.—The Commune of Milly, where Lamarine lived for a long time, is about to set up a bronze bust of the poet in place of the stone one executed twenty years ago by Mme. Adam Salomon, and which is now in a perishing state.—The government has submitted to the chamber of Deputies a project for opening a canal from Marseilles to the Rhône. The canal, about 54 kilomètres in length, would run along by the coast as far as the point Lave, piercing the long range of Rove by a tunnel about 3 kilomètres long, and coming out on the south of the lake of Berre as far as Martigues, and subsequently joining the Rhône. The estimated cost is about eighty million francs. It would give a great extension of commerce to Marseilles.—The death is announced of M. Paul Lenfant, formerly an architect to the City of Paris, and that of Mr. Maurice Dornoy, President of the Society of Architects of Aube.—The death is also announced of the Sculptor Léon Delhomme, who was a member of the Municipal Council of Paris, and occupied himself much with artistic questions in that assembly. He was a pupil of Dumont, and was the author of the statue of the Republic placed in the new Sorbonne, and of the statue of Louis Blanc in the Place Monge.

MISCELLANEOUS.

THE COMMISSIONERS OF SEWERS.—At the meeting of the Commissioners of Sewers, held at the Guildhall, on Tuesday last week, the Chairman (Mr. Gordon) called attention to a statement in the recent report by Major Carden on the subject of explosions in the streets, in the district of St. Pancras, caused by electricity. The electrical inspector of the City, being asked whether danger existed from a similar cause in the underground wires of the City, the Inspector (Mr. Voysey) stated that the explosions referred to in the report which had been caused by a deposit of sodium at points where electricity passed through bare metal wires in contact with hardware insulators, had occurred through the leakage of wet coming into contact with the sodium, but such accidents could not occur in the City because they had no

bare metal conductors, and no hardware insulators. From the Engineer's report for the past year it appeared that no new sewers had been made during that period, but 387 houses and warehouses had been drained. Thirteen miles of streets were lighted by electricity by means of 483 arc lamps, which had superseded 1,338 gas lamps. In the streets and courts of the square mile on which the City stands, 20,232,217 gallons of water had been used for cleansing purposes and 1,400 loads, on the average, of house and street refuse had been removed every week—of which about one-third had been treated by fire in the destructor at Lett's Wharf, which had been at work day and night throughout the year, except during a few days when it was stopped for repairs. The report stated that a day census taken by the Corporation showed that 1,186,000 people daily entered the City, either on foot or in carriages, and that 92,000 vehicles entered and left the City on the same day—a volume of traffic not equalled, or even approached in any other city in the world.

LECTURES ON SANITATION IN NORFOLK.—The Sanitary Institute with the County Council of Norfolk and the Technical Education Committee, Norwich, have arranged a course of twelve lectures and demonstrations for sanitary officers and others in Norfolk. The lectures have been arranged for the special instruction of those desirous of obtaining knowledge of the duties of sanitary officers, but will be open to all who can attend. The Norfolk County Council will pay half the train fares and half the examination fees of all selected candidates in the administrative County of Norfolk. The grant towards train fares and examination fees will be paid at the end of the course to those only who have attended two-thirds of the lectures and who sit in the examination. The inspectors of nuisances, and they will pay full fares and fees of all who pass. The Council of the Sanitary Institute will arrange to hold an examination for Inspectors of Nuisances in Norwich on July 15 and 16. The lectures, which will be given in the Technical School, Norwich, at two o'clock on Saturdays, will commence on the 30th inst., and will conclude on June 29.

PRESENTATIONS TO A SURVEYOR.—Mr. Baker, C.E., has just been appointed Borough Surveyor for Middlesbrough. At the last meeting of the Canterbury Corporation, the resignation of Mr. Baker as Borough Engineer, was accepted with expressions of regret, and the Corporation decided to mark their appreciation of his services by presenting him with an illuminated address and a cheque for 100 guineas. Subsequent to the meeting of the Corporation a gathering of the officials and citizens of Canterbury was held, at which Mr. Baker was presented with a gold watch and a purse of gold, subscribed for by the citizens and officials, on the initiative of the members of the Chamber of Trade.

THE WATER COMPANIES AND FROZEN MAINS.—The attention of the Grand Junction Waterworks Company having been called to the fact that many of their mains are frozen, Mr. A. Fraser, the engineer to the Company, has written that before next winter the Company's pipes shall be lowered to a proper depth, if they are not sufficiently low now. It is, he remarks, very difficult to say what is the proper depth to lay pipes, as the frost appears to have penetrated to a greater depth in some places than in others. A depth of 2 ft. 6 in. from the top of the pipe should, he thinks, be sufficient, and the Company will take care to have this put right before next winter.

THE SANITARY INSTITUTE.—At an examination for Inspectors of Nuisances, held at Newcastle-on-Tyne on Friday and Saturday, March 15 and 16, the following candidates were certified, as regards their sanitary knowledge, competent to discharge the duties of Inspectors of Nuisances:—F. Barrett, Keighley; T. B. Burrell, Seaham Harbour; N. Coates, New Brighton, Cheshire; G. Cooks, Blyth; W. Davison, Corbridge-on-Tyne; W. Douglas, Glanton R. S. O., Northumberland; J. G. Forsythe, Sunderland; J. Kilner, Penrith; J. R. MacMillan, Earsdon; K. T. W. Morrison, Newcastle; J. Porter, Perth; W. Ramsay, Stockport; J. W. Scott, Workington; J. Sheraton, Seaham Harbour; W. Wood, Hull.

ENGINEERING APPOINTMENT.—Mr. Charles J. Jenkin, Assoc. Inst. C.E., A.M.I. Mech. E., has been appointed Resident Engineer on the Llan-eudino (N. Wales) Sewerage system, at Llan-eudino, under the direction of Mr. E. Paley Stephenson, Engineer to the Urban District Council.

MORE ROMAN REMAINS AT BATH.—At the meeting of the Baths Committee at Bath on the 15th inst., considerable discussion took place respecting the excavations which have been for some time proceeding adjacent to the pump-room. In a Roman duct, which has been in process of excavation, have recently been found a number of gems and stones, engraved and partially engraved. The surveyor of works was of opinion that the presence of these stones in this condition showed that some of the smaller rooms of the old baths were used as shops, one of them being that of a lapidary. He also reported the discovery of a very massive stone drain crossing the duct, some of the stones being 7 ft. long. Further, in another part of the works, beneath the pump-room itself, he had found pillars. It was resolved that the surveyor of works should prepare

a special report for presentation to the council, who should be asked to vote a sum for continuing the explorations in that direction.

SANITARY INSPECTORS' ASSOCIATION.—A deputation from the Council of the Sanitary Inspectors' Association waited on Sir Walter Foster, M.P., at the offices of the Local Government Board, on the 15th inst., for the purpose of bringing to his notice the insecurity of the tenure of office of sanitary inspectors as set forth in the annual appointments sanctioned by the Board, and also the meagreness of the inspectors' salaries. The deputation included, besides a large number of Metropolitan members of the Association, delegates from Derby, Wigan, Burton-on-Trent, Marlstone, and other provincial towns. Sir B. W. Richardson, President of the Association, who introduced the deputation, said the necessity for a decision on the points named was raised by the manner in which a Mr. Watson, of Burton-on-Trent, had been treated by his Board. The district had been on more than one occasion revised and the salary reduced, until now Mr. Watson had been thrown out altogether. This was only one of several instances which were almost as bad. He admitted that the Local Government Board had no direct power, but it had a great deal of negative power, and what they wanted was a direct change by which a certain tenure of office should be given to all sanitary officers. Sir Watson went on to suggest that wages of officers should depend on the Local Government Board, that the minimum salary should not be less than 200s. a year, with a maximum of 350s., and a small retiring pension. Other speakers having been heard, Sir Walter Foster, in the course of his reply, said that, now that the local government of the country was being brought under the control of the central government with local authorities to do away with appointments for short periods, and to encourage the appointment for a term of years or permanently. They were prepared to go so far without any Act of Parliament. In reference to salaries, he found they were not as a body paid properly, and in those cases which had been brought before the Association, as they were in inadequate salaries. As to pensions, that must be a thing they must work out for themselves. He acknowledged that the case of Mr. Watson, to which reference had been made, was a hard one; but it was one of those in which the Local Government Board had no real authority. The deputation then withdrew.

ENGLISH GOTHIC ARCHITECTURE.—Mr. W. J. Anderson, A.R.I.B.A., delivered a special lecture in the School of Art, Glasgow, on the 14th inst., on English Gothic architecture, with particular reference to the cathedrals. The Early English period was divided into lancet and geometric, and the term curvilinear preferred to Decorated, as these forms in the window tracery were in England an almost un-failing mark of the date of the building. In French Gothic the constant aim of the designer was to produce overpowering effect of internal height, the vaulted roofs demanding for their support a great scaffolding of superimposed flying buttresses as at Beauvais and Bourges, which externally destroyed all sense of repose. This was to be defended and praised in the prevailing fashion as the only true Gothic and the logical outcome of the Gothic idea, we were forced to believe that the Gothic idea carried to its conclusion was opposed to sound constructive science and to æsthetic effect. But the English mind of the thirteenth century aimed at an impression of great internal length and moderate height of avenues, which served their chief purpose best, and at the same time had the happiest effect externally, enabling them to rear such a central tower as would be the glory of the whole fabric. The great length gave repose externally, and the bold transept projection aided materially to produce a picturesque effect from any point of view. The group of central and western towers generally designed for English cathedrals, and carried out at Carlisle, Lichfield, York, and Lincoln, was the finest that could be imagined, and there was no possible vantage ground which would give a disappointing view of such buildings. The apsidal termination of the interior of the French churches was magnificent, but was almost compensated for by the splendid eastern window of the English, at Carlisle and Lincoln, for example, and the good appearance of the square end externally. The greater number of the English cathedrals was shown by lantern views, externally and internally, and in detail, and a short series of views of Scottish architecture followed. The lecturer contended that in the main Scottish Gothic architecture does not differ materially from English work, and was less influenced by French Gothic than had been popularly supposed. Scotland was strong in Transitional work, which often took the form of the pointed arch with Norman mouldings and the French square abacus and capital, as if the form of the pointed arch had travelled northward more swiftly than the appropriate details of the Gothic style. This it was which gave it the resemblance to French Gothic, as at Jedburgh, Newe, and this, it was suggested, had misled critics in the chief distinctive features of the French style—excessive height, absence of central tower, general use of the apsidal termination, the square arch order, the central buttresses and chapels, and the rose windows—Scotland had no

part with France, and the marks of French influence were not nearly so apparent as of English.

THE OLD EDINBURGH SCHOOL OF ART.—The sixth of the series of lectures being given under the auspices of the old Edinburgh School of Art was delivered in the Free Assembly Hall on the 16th inst., by Mr. S. Henbest Capper, A.R.I.B.A., on "St. Giles." Mr. Capper at the outset said it was remarkable that they did not know in what state the great cathedrals of Scotland were just before and just after the Reformation. It was, however, perfectly clear that all the internal decorations of the great churches, the carved stalls, the vestments and church vessels, the manuscripts of the church libraries, and the monuments of the dead were all irremediably destroyed. It was an amazing fact that the only existing un mutilated effigy of a Scottish king or queen was that of Mary Stuart in Westminster Abbey. Taking up the history of St. Giles', perhaps the most important of the lesser churches that survived the upheaval of the Reformation, the lecturer in a series of illustrations pointed out the parts of the existing building which were anterior to the disastrous invasion of Richard II. in 1385, the enlargements undertaken immediately thereafter, the Albany Aisle and other additions of the first year of the fourteenth century, and finally the Preston Aisle and reconstruction of the choir about 1460, when the parish church was converted into a collegiate establishment. The subsequent events of the church's history, its connexion with John Knox and Queen Mary, and the riot of 1637, were briefly touched upon.

WATERWORKS, LEEDS.—At a meeting of the Leeds Waterworks Committee, on the 8th inst., Alderman Cooke presiding, a report was submitted by Mr. Hill, C.E., on the work of the reconstruction of the waterworks. Mr. Hill had examined the bottom of the trench, and approved of the work done. He agreed with the City Engineer (Mr. Hewson) that the re-pudding of the deepened portion of the trench might now be safely commenced. Brick side screen walls, he thinks, should be built on the reservoir side of the trench to protect the puddle. The total depth of the trench from the finished road level to the bottom is 170 ft., the length along the bottom 420 ft., greatest width at the top 26 ft., and average depth of shale taken out below the bottom of the old trench 39 ft.

LEGAL.

BUILDING ON CHURCH SITES IN THE METROPOLIS.

IMPORTANT CASE IN CHANCERY DIVISION.
ON the 14th inst., Mr. Justice North, in the Chancery Division, gave judgment in a summons taken out under the Vendor and Purchasers Act, 1874, in the matter of a contract between the Ecclesiastical Commissioners and the New City of London Brewery Company, Limited, which raised the question whether the Commissioners could give a good title to the site of a church for building purposes, under the Union of Benefices Act, 1860, or whether the effect of the Dissolved Burial Grounds Act, 1884, as affected by other Acts, was to prohibit building on such sites. It appeared that the New City of London Brewery Company contracted to buy the site of the church of All Hallows the Great, Upper Thames-street, from the Commissioners for the purpose of making additions to their brewery, but on investigating the title the company found that the site of the church appeared to be a dissolved burying-ground within the meaning of the Dissolved Burial Grounds Act, 1884, and Section 4 of the Open Spaces Act, 1887, and as such was prohibited from being built upon. There was no dispute but that the sale was the sale of a building site, and that if building was prohibited on it the sale must fail. It was also beyond dispute that interments had taken place within the church itself. The principal question, therefore, was whether the church could be said, because interments had taken place within it, to have been set apart at any time for the purposes of interments. Mr. Samuel Hall, Q.C., and Mr. W. B. Heath appeared as counsel for the New City of London Brewery Company (the purchasers); and Mr. Swinburn Eady, Q.C., and Mr. Blackley, for the Ecclesiastical Commissioners (the vendors).

At the conclusion of the arguments of counsel, his lordship, in giving judgment, pointed out that the Union of Contiguous Benefices Act, 1860, although general in its title, was confined to the metropolis. Section 17 of the Act drew marked distinctions between the site of a church, and churchyards and burial grounds, providing carefully for the reverential removal of human remains interred under any church itself, and also expressly enacting that burial-grounds and churchyards should not be sold. Section 22 of the Act referred to the application of the purchase-money of the site of any church, sold under the Act, in a way that contemplated in his opinion that such purchase-money could only arise from the sale of the site as a building site. In his opinion, independently of subsequent legislation, it was clear that under the Act of 1860, the Commissioners could have sold the site to a purchaser who could build upon it. In overruling the argument that had been urged on the construction of Section 4 of the Union of Benefices Act Amendment Act, his lordship remarked that that Act recited certain

older Acts, but did not refer to the Metropolitan Act of 1860, and gave powers to the bishop, with the consent of the incumbent by faculty, without the necessity of the consent of the several high authorities who had to be applied to under the Act of 1860. He considered that the construction he put upon the Act had been adopted by the Court of Appeal in the case of the Ecclesiastical Commissioners v. Kino, a case where it was held that the Commissioners were entitled to restrain building so as to interfere with access of light to the space that had been occupied by ancient church windows. He came to the conclusion that the site of a church, where interments had actually taken place, could, in no sense, from that fact merely, be said to have been set apart for the purpose of interments, and that the first effect of the Acts, relied upon by the purchasers, was not to interfere with their right as purchasers from the Ecclesiastical Commissioners to build on the site of the church. He, therefore, gave judgment in favour of the Ecclesiastical Commissioners.

THE LAW COURTS AND THE CONTRACTORS.

ON Monday last in the Court of Appeal, consisting of the Master of the Rolls and Lords Justices Lopes and Rigby, Mr. Danckwerts moved, *ex parte*, in the matter of an arbitration to disputes with Bull & Sons and Her Majesty's Commissioners of Public Works and Buildings, on behalf of the Commissioners for leave to appeal from an order made by Mr. Baron Pollock in Chambers, extending the time for making an award until the 31st of the present month, the time having expired on December 31st last. The learned counsel stated that the arbitration had reference to disputes which arose in June, 1883, about the Law Courts. The submission was dated in June, 1883, but there had been numerous extensions of time, and practically nothing had been done in the arbitration, as there had been only a few formal sittings. Although Messrs. Bull & Sons had delivered some particulars, they had not yet delivered full particulars of their claim. The present extension of time was granted to enable their creditors to see whether they would finance them, and if so, it was understood they would apply for a further extension. The Commissioners had already expended a large sum of money in the matter, and the arbitration had been delayed so long that they were anxious to take the opinion of the Court as to whether any further extension of time should be granted.

In the result their Lordships refused to give leave to appeal.

ACTION FOR OBSTRUCTION OF LIGHT: HARRIS v. KINLOCH & CO.

THE case of Harris v. Kinloch & Co., Lim., came on for hearing in the Chancery Division before Mr. Justice Kekewich on Tuesday, it being an action brought by the plaintiff, Mr. John Harris, the owner in fee simple of a building known as No. 36½, Gower's Walk, in the City of London, against the defendants, for an injunction to restrain them from erecting on the south and east of the plaintiff's property any building in such a way as to interfere with or obstruct the access of light to his skylights. There was also a claim for *rescission* damages. The plaintiff's case was that the defendants, who were the owners of property adjoining his on the south side, had recently pulled down buildings which abutted on his building on the south, and intended to build on the site of the old building warehouses, which would be from 30 ft. to 50 ft. higher than the old building, and for that purpose the plaintiff alleged the defendants intended to raise the wall on the south of his building from 30 ft. to 35 ft. beyond its former height. The plaintiff also alleged that the defendants intended to extend the south wall at the same height towards the east. His Lordship, after hearing evidence and the arguments of counsel, granted the injunction asked for as regarded the south wall, assessing the damages at 251., the defendants to pay the costs of the action, except so far as they had been increased by the plaintiff seeking to recover damages for an alleged trespass, those excepted costs being paid by the plaintiff or set-off against the others.

Mr. Warrington, Q.C., and Mr. Curley appeared as counsel for the plaintiff, and Mr. Renshaw, Q.C. and Mr. Theobald for the defendants.

CASE UNDER THE 1855 METROPOLITAN BUILDINGS ACT:

LONDON COUNTY COUNCIL v. J. GROVER.
AT the Marlborough-street Police Court, on the 14th inst., Mr. John Grover, a builder, of the firm of J. Grover & Son, Wilton Works, New North-road, appeared in answer to an adjourned summons under the Metropolitan Buildings Act of 1855 for making openings in the upper part of the east party wall, contrary to Section 12 of the Act, while erecting a building at the corner of Harewood-place, Oxford-street. Where part of the premises complained of stood there formerly existed stables two stories high. In the wall carried to this height there were apertures in which windows had been placed. The question was whether the wall which had

been built up was a party-wall within the meaning of the Act. It was held by the prosecution that it was a party-wall, and, therefore, objection was taken to certain of the apertures which had been made in it for the windows. In support of this proposition Mr. Avory, who prosecuted for the County Council, quoted several judgments which had been given in the higher Courts, and specially referred to the case of "Williams v. Ball," in February, 1890. Mr. Dickens contended that, within the meaning of the Act, the wall would not be called a party wall, and that, as a matter of fact, it stood within land absolutely belonging to the defendant. Evidence was given showing that the new windows had been opened with the consent of the owner of the property adjoining. Mr. Hannay, in giving his decision, said the question was whether a wall which was, in fact, an external wall where the windows were placed in it, although a party wall lower down, must be held to be a party wall above the point where it ceased to separate two buildings. He came to the conclusion that there was nothing in any part of the Act to support the complainants' contention, while there were some things which, to say the least of it, favoured the defendant. What authority there was also in his favour. The wall in dispute being, where the windows were placed, an external wall in fact, there was nothing in the Building Act, or in any reported decision, to make it a party wall in law. He would not touch upon the point that this wall was built upon the defendant's land, as it was used, not ownership, that determined its character. Nor had he noticed a circumstance upon which Mr. Avory seemed to lay some stress—that the wall had been carried up for the regulation distance of a party-wall above the roof of the new building. That could not make it a party-wall, whatever the architect might have thought; and it was clearly impossible to leave it without some sort of finish.—The summons would be dismissed.—Mr. Dickens asked for costs, and Mr. Hannay allowed 10s. 10s.

CAPITAL AND LABOUR.

THE SITUATION IN THE LONDON BUILDING TRADE.—An adjourned conference between the representatives of the Central Association of Master Builders of London and delegates from the various trades was held on Tuesday, but was dissolved, as the delegates still persisted in their opposition to the suggested amendments, and especially with regard to the clause—"That no workman shall be placed under any disability by reason of being or not being a member of a trade society."

STATE OF EMPLOYMENT IN FEBRUARY.—The month of February (says the *Labour Gazette*) has been abnormal as regards employment in out-door trades. Owing to the frost, which lasted through the greater part of the month, many branches of out-door labour were almost at a standstill, the result being a considerable increase in the number of the unemployed, and of applicants for poor-relief. Towards the close of the month matters improved, but at the end the percentage of unemployed in unions connected with the Building Trades was more than twice as great as at the corresponding time last year. In the Building Trades the percentage of unemployed in unions making returns has increased from 8.2 to 10.1, compared with 5.9 per cent. in February, 1894. The plumbers, however, have been well employed at the end of the month. Five disputes occurred in the Building Trades, of which two were on questions of wages and three on questions of working arrangements.

MEETINGS.

FRIDAY, MARCH 22.

Sanitary Institute (Lectures for Sanitary Officers).—Dr. Louis Parkes on "Water-Supply, Drinking Water, Pollution of Water." 8 p.m.
Institution of Civil Engineers (Students' Meeting).—Mr. G. B. Williams on "Pipe-Siphons under the Ouse, at York." 8 p.m.

SATURDAY, MARCH 23.

Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—Inspection and Demonstration of Beddington Sewage Farm, Croydon.
Queen's College, Cork.—Mr. Arthur Hill on "The History of Architecture." XVI. 3 p.m.

SUNDAY, MARCH 24.

South Place Institute.—Mr. C. Hill on "Plumbing: Past and Present." 4 p.m.

MONDAY, MARCH 25.

Royal Institute of British Architects.—Mr. H. W. Burrows on "Sound in its Relation to Buildings." 8 p.m.

TUESDAY, MARCH 26.

Institution of Civil Engineers.—Discussion on Mr. H. Davey's paper on "Steam-Engine Economy: Condensing Engines." 8 p.m.
Royal Victoria Hall, Waterloo Bridge-road.—Professor Seaman on "Modern Athens." 8 p.m.
Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—Dr. E. C. Seaton on "Infectious Diseases and Methods of Disinfection." 8 p.m.
Builders' Clerks' Benevolent Institution.—Adjourned General Meeting of Donors and Subscribers. 7.30 p.m.

WEDNESDAY, MARCH 27.

Carpenters' Company (Free Lectures on Matters Connected with Building).—Sir E. Leader Williams on "The Works of the Manchester Ship Canal." 8 p.m.

one at the Licensed Victuallers' Asylum, Asylum-road, Old Ken- ning, London. Mr. W. F. Potter, architect. Quantities prepared by Mr. C. R. Griffiths, 35, Farnham-street, Holborn, E.C.	
W. H. Collings & Co.	£1,049
W. Smith	821
Walker	694
F. Dawes	595
Pritchard & Renwick	570
H. H. Hollingsworth	559
S. Hayworth & Sons, Kings- land*	487

*Accepted.

MAESTEG (Wales).—For additions to the Oakwood School, for the Cwmidi and Llanywdd Higher School Board. Mr. E. W. Burnett, architect, Tundale, near Bilsington. —
 15, J. & Co. £1,458 J. Rees £1,350
 F. Gayland 1,350 E. Evans, Maesteg 1,350
 Accepted.

PETERBOROUGH.—For the erection of two dwelling-houses, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 93, 95, 97, 99, 101, 103, 105, 107, 109, 111, 113, 115, 117, 119, 121, 123, 125, 127, 129, 131, 133, 135, 137, 139, 141, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, 221, 223, 225, 227, 229, 231, 233, 235, 237, 239, 241, 243, 245, 247, 249, 251, 253, 255, 257, 259, 261, 263, 265, 267, 269, 271, 273, 275, 277, 279, 281, 283, 285, 287, 289, 291, 293, 295, 297, 299, 301, 303, 305, 307, 309, 311, 313, 315, 317, 319, 321, 323, 325, 327, 329, 331, 333, 335, 337, 339, 341, 343, 345, 347, 349, 351, 353, 355, 357, 359, 361, 363, 365, 367, 369, 371, 373, 375, 377, 379, 381, 383, 385, 387, 389, 391, 393, 395, 397, 399, 401, 403, 405, 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The Builder.

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National Opera House, Budapest.—The late Herr von Ibyl, Architect	Double-Page Ink-Photo.
Eastwell Park: Additions and New Front.—Mr. W. Wallace, Architect	Double-Page Photo-Litho.
St. John's Church, Bassenthwaite Lake.—Mr. D. Brade, Architect	Single-Page Photo-Litho.
Church of St. Teilo, Cardiff.—Mr. G. E. Halliday, Architect	Single-Page Photo-Litho.
Ancient Carved Wooden Newsels at Argeles (Hautes Pyrenées)	Double Page Ink-Photo.

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St. Sophia, Constantinople.—II.



Our previous article on St. Sophia as illustrated in Messrs. Lethaby & Swainson's monograph (see page 213 *ante*) we considered some of the points raised in regard to the construction of the great typical Byzantine building. But bold as the method of construction was, it was not calculated to produce a satisfactory internal effect in itself, if nakedly shown. A stone church of such design, with the domes symmetrically built on centreing, might produce a grand and perfectly satisfactory interior if left undorned. But in St. Sophia the internal structure was a skeleton only, intended to be covered by decorative materials which, though leaving the main lines and surfaces of construction visible in their technical relation to each other, were to hide the comparatively rough and crude brickwork, put together by methods which produced a stable construction, but which, if left un concealed, would have had a very unsymmetrical effect to the eye. We have already remarked on this in reference to the curious system employed in building wagon-vaults and cross-vaults without centreing, and in which the bricks were canted in various directions in order to facilitate the task of building them in such a manner as to be self-supporting. There was no intention that these expedients should challenge observation in the completed building. They were the structural core only, of which all that was demanded was that it should stand firm in its place, as a series of surfaces to which decorative materials could be attached. If we follow out the process in our minds, it may seem that this adoption of an internal veneering of decorative material, which was to become such a characteristic of Byzantine architecture, was really an inevitable result from the modes of construction employed. A Gothic vault, with the ribs built up first on centreing, can be filled in between these ribs in a manner sufficiently symmetrical and finished to be agreeable to the eye, especially as the whole is controlled by the strongly-marked and symmetrically-arranged lines of the groin-ribs. We do not say, of

course, that the vaulted surfaces were always or even generally, in Mediaeval work, left or intended to be left as uncovered masonry—but they can be so left without disagreeable effect. A Byzantine dome or vault could not be. It left a motley surface of brickwork arranged in any way in which the courses could best support each other, and with no leading or dividing lines to control them. The collection of diagrams of Byzantine vaulting in Choisy's illustrations will render this obvious to any one. Internal lining was therefore a *sine quâ non*, as far as the vaults were concerned; and the demand for it in the roof led naturally to carrying out the same system on the walls, if it was desired that the whole interior should be harmonious and in keeping. The ambition of Justinian to produce a splendid interior, regardless of cost, no doubt contributed to the special lavishness of the interior decoration in St. Sophia; but the employment of such an inner skin of decoration was an essential element in the style.

In regard to what is in some respects the most important and most interesting portion of the decorative lining, the mosaics in the domical surfaces, the authors are entirely sceptical as to figure decoration having been any part of the original scheme. Their reasoning is, we think, conclusive. In the first place, not a word is said about figure-subjects in the poem of the Silentiary, who, considering that he spends so much detailed and rapturous description over such things as the method of lighting, &c., would certainly not have omitted to celebrate any important pictorial decoration, had there been any to celebrate. Secondly, that such figures, had they existed, would unquestionably have been destroyed during the outbreak of iconoclastic feeling in the eighth century, when sacred pictures were forbidden. We do not attach so much importance to this last reason in itself, because it might have been thought too much trouble to destroy a large area of mosaic work, especially when it was almost necessary to replace it with some other design; but the absence of reference to pictures by the Silentiary, coupled with the historic fact of the iconoclastic outbreak, seems conclusive. Then comes the question, How were the domical surfaces originally adorned? Quoting the Silentiary's statement that "at the highest point was depicted the Cross, the protector of the city," they suggest that near the apex

of the dome a great cross extended four arms over the central space, the interspaces being powdered with stars, and that stars were also used on the ground between the ribs of the dome. They mention a reference to stars in the Silentiary's poem, but we do not identify the passage in their translation. The idea of the cross as a decoration on the domical surface is, however, curiously confirmed and illustrated by the crosses in the mosaic of a small vault compartment next the bema, of which a sketch is given in the book. These are crosses of the Latin form, not the equal-armed Greek cross, and they seem to be set according as they will best fill the surface, that in the lower and narrower portion of the vault being set vertically; the next, which comes on a wider part of the vault; being set across, at right-angles to the first one. This strikes us a very naïve method of decoration, and we can hardly understand the satisfaction with which the authors (who have obviously taken everything Byzantine under their protection) seem to regard it. It is highly characteristic, no doubt, of the scene and the time, but it is not a form of decoration which displays any thought, or which is in any way specially suited for the surfaces of vaulting in a general way. The central cross in the centre of the large dome may have done well enough; there it would be appropriately placed as a matter of form, and as a central symbol would have had a striking effect; but to praise, as the authors do in one passage, the decoration of a dome by putting small crosses all over it, is certainly further than we can go.

It is rather a question whether the internal effect of the dome gains by the introduction of the ribs. This is a part of the whole question of the most effective treatment of domical surfaces, which depends to some extent on how one regards a dome in the constructive sense. We are inclined to think that a masonry dome is more properly to be regarded as an expanse of domical surface than as a collection of arched ribs placed close together; and that, therefore, a treatment which gives it an unbroken surface is more true, as well as grander in general effect, than one which it breaks up into vertical slices. The ribs somewhat take away from the mystery of the dome; and if it is assumed, as seems probable, that the principal decoration was a star powdering, the rib treatment certainly must have taken

away all truth of suggestion from that form of decoration. As to the absence of figures in the original mosaics, that may be considered to have been no loss to the church as Justinian built it. Figures in domes on such a scale and at such a height must either be too small to have any effect, or, if large enough to be seen, must destroy the scale of the building, as was the case with the immense cherubim subsequently introduced in the pendentives, and which have figured in so many illustrations, including the curious attempt at an interior perspective view in Grelot's book.

It is argued by the authors that the ground, and any patterns evenly distributed over the vaults, are of the original work, because the labour and cost of removing the whole large surfaces of tesserae would never have been incurred, though figures on a part of the surface might have been inserted, or removed and their place filled up. The actual size and spacing of some of the tesserae is given in a diagram; they hardly average more than a quarter of an inch square, were spaced about half their width apart, and fixed in the cement at an angle, so as to be normal to the line of vision, or approximately so; a method which, as our readers may remember, has been adopted in the mosaics recently carried out in St. Paul's.

The marble veneer which forms the decoration of the walls is put on in what may be called a very non-constructive manner, there being no pretence of the imitation of banded masonry. The larger slabs were mostly placed vertically, dark and light slabs alternating, and the whole intersected by narrow horizontal courses. The main piers were of stone, but this, say the authors, was only for strength, as they were not intended to be seen any more than the rough brickwork. One rather important point is mentioned by Procopius in regard to the construction of the great piers: "Of these stones, those which make the projecting angles of the piers are cut angularly (*engonios*), while those which go in the middle parts of the sides are cut square." There is no comment on this, as far as we have observed, in the book. The meaning we take to be that the angle-stones were cut out into solid returns, so as to fall into the masonry on either hand. Something of the same kind is to be found at times in internal (not external) angles of Mediaeval masonry, where the stones are cut out from the solid into the shape of the angle. In regard to the joining of the veneer to the brickwork the following passage is of interest:—

"The building completed in this form (in the rough walling) we must remember was made up of vast masses of thin bricks, of which the mortar occupied probably a half of the aggregate: this had to thoroughly settle down and dry before the rest of the marble masonry was inserted, and the wall casings applied. The marble work, however, was all the while being prepared, and, the building once ready, the windows were inserted as screens in the openings previously left; marble jambs and lintels for the doors were placed in position also, with windows above them fitting out to the brick arches. The walls were then sheeted with thin marble covering, the vaults were overlaid with mosaic, and the pavements were laid down. In this way, as the bricklayers had not to wait for the masons, the carcass was completed in the shortest possible time; and by reserving the application of the marble till the structure was dry and solid, it was possible to bring together unyielding marble and brickwork that must have settled down very considerably."

Nothing in St. Sophia is of more interest than the treatment of the carved work in the capitals, a subject into which the authors have gone at considerable length and in a very instructive manner. The relation of the Byzantine to the Classic capital shows a peculiar mingling of likeness and difference, both in the general design and in detail. Everywhere we find the reminiscence of the Classic capital, as far as detail is concerned, but with a complete change in outline, and a very marked and peculiar modification in detail. The acanthus leaf of the Classic capital is constantly to be met with, but changed to an extraordinary extent, in style and expression, by means of very small modifications in detail, which yet entirely

alter its character. It becomes stiff, bristling, pointed, sparkling, with a new life and vigour infused into it. The Ionic volute is sometimes present in a form, proportion, and position very like the original, as in the capitals of the grand floor arcades; in other places, as in the capitals of the upper arcades, it is a mere reminiscence of the old form, almost crushed by the characteristic Byzantine block, a frustum of an inverted cone, over it. In the capitals of the lower or "great order" the volute appears in its proper place at the upper portion of the capital, with only an enriched abacus moulding over it; in the capitals of the upper order, a column of which is shown in fig. 1, it is at the bottom of the capital, and serves to assist in the change from the cylinder of the column to the square of the capital, by falling in beneath the angle of the latter. This upper order capital (fig. 1) is a

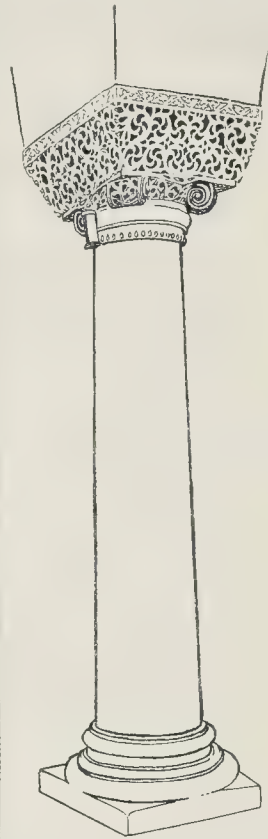


Fig. 1.

remarkable feature in every way, more especially in its extraordinary divergence from the form of the lower order capitals. In the latter, with the exception of the slightly convex (instead of concave) form of the bell, the general outline and proportion of the Classic capital is quite recognisable; in the capital of the upper order (fig. 1) all trace of the Classic capital, as to the general form, has vanished. As the authors observe, the general form seems to be the result of the effort to evolve a capital which, while seating itself on a cylindrical column, should be fitted to form a broad impost for an arch to spring from. This use of the capital necessitates a pretty wide spread towards the top, combined with great mass and solidity. In accordance with these requirements, the foliage in relief, characteristic of the Classic Corinthian capital, has entirely disappeared, and

the decoration is obtained by sinking into the surface. With this new method of execution the style of ornamental design has entirely changed, and we see, instead of the broad leaves of the Classic capital, a collection of rather thin forms marked out by deep, narrow hollows between them. This decoration, while extremely light and effective, has the merit of preserving nearly the solid mass and strength of the block, which is hardly affected by the narrow sinkings necessary to define the design. This method of producing design from the flat by sinking hollows between it is characteristic of Byzantine work, and is curiously illustrated in a piece of ornament on an impost moulding (fig. 2), where we see old forms of Greek ornament assuming quite a new life and character from their production in this counter-sunk manner. The column shown in fig. 1 illustrates another point in the treatment of the columns in St. Sophia, the use of a bronze ring at a necking. These metal rings, which weigh, and were used at the junction of the shaft both with capital and base, obviate the cutting away of the material of the column to provide astragal and apophyses, served to bind the column together against the tendency to crack under the superincumbent weight, and had also, the authors suggest, another practical value, which, however, we do not believe was contemplated by the builders. This was, according to their suggestion, to prevent the lead sheet inserted in the joints from spreading under pressure. They would have this effect, perhaps, practically; but it is obvious from the

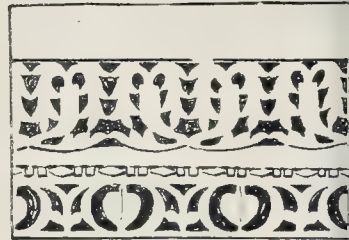


Fig. 2.

contemporary descriptions, that the practice of leading the joints was considered a panacea for the effects of any uneven pressure. The stones of the great piers, Procopius tells us, "are fastened together, not with lime, called unslaked (*asbestos*), nor with asphaltum; the boast of Semiramis at Babylon, nor with anything of the kind, but with lead, which poured into the interstices, has sunk in the joints of the stones, and binds them together." The fact which modern experiment has shown, that lead joints under pressure are likely to split the stones, spreading, seems to have been quite unsuspected at that time, and therefore we can hardly suppose that the metal bands in the lead joints of the columns were put there to avert that mishap.

The lighting of St. Sophia was evidently one of the points in the interior effect of the building which most struck and delighted the spectators when the building was new. As described by Paul the Silentiary, who rises to his most poetic mood on the subject, the main lighting was from a great central corona suspended by light chains descending from the margin of the dome and meeting in a central pendant circle. He speaks also of numerous other hanging lights, some in the form of ships, carrying, as he says, "freights of flame," and also of the standard lights on the silver columns of the Iconostasis, which were designed in branch springing from a central stem and widening downwards to the base; "these one might compare to the mountain-nourished pine, or cypress with fresh branches." But the majority of the lights were hung by chains from the ceiling into the centre space

a most effective and beautiful manner of lighting a building.

The authors have endeavoured to trace out, among existing examples of hanging lamps, some which may serve to illustrate the probable appearance of the St. Sophia lamps. Of these some interesting illustrations are given in the book. One of these (British Museum), is a flat bronze disc, pierced with holes round the edges for lamps, the middle portion cut into a ray pattern. If we imagine glass lamp vessels inserted in these holes, this would almost exactly answer to the description of the Silentiary:—

"And beneath each chain he has caused to be united silver discs, hanging circle-wise in the air, around the space in the centre of the church. Thus these discs, pendent from their lofty courses, form a coronet above the heads of men. They have been pierced too by the weapon of the skillful workman, in order that they may receive shafts of fire-wrought glass, and hold light on high for men at night."

The design of the example given in the book is hardly of that date, but it probably represents very closely the kind of lamp used in St. Sophia. Of the peculiarly picturesque type of lamp mentioned by the Silentiary, that in the form of a ship, no illustration is given—possibly there is none to give. The idea seems peculiarly typical both of Byzantine and of early Christian fancy. The authors quote Paulinus in regard to the effect of the lights at his church at Nola, which "were suspended in such profusion that they seemed to float in a sea." The simile seems to suggest a certain connexion of ideas with the ship form of lamp.

Into all the points in the book, which is crowded with matter, we cannot profess to go; but some of the illustrations are curiously illustrative of the peculiar character of Byzantine work, which is almost unmistakable, but is so difficult to define. One thing that strikes one in Byzantine detail is perhaps a kind of unexpectedness. Capitals and other details appear at first sight Classic, and yet they differ essentially from Classic types; mouldings are of quite different profiles from what one meets with elsewhere. In this latter respect the Byzantine architect hardly shone. His mouldings are somewhat coarse in profile, having lost the refinement of the Greek type and not acquired the force of the Mediæval type of moulding. One characteristic of Byzantine taste seems to be a love of oval forms. We see this illustrated in the book before us, in the plan of the font from Constantinople (fig. 10), in the water vessels in fig. 11, in the curious and most characteristic "phiale," like a half melon stuck on a pole, in fig. 27. In many other ways the Byzantine spirit is discernible at a glance, yet without one being able exactly to say in what it resides. The bronze door of the narthex, for instance (fig. 67 in the book); what is it which gives that peculiar unmistakable "Byzantine" appearance? Perhaps the most characteristic feature is the crosses in the panels, with their arms thinnest at the crossing, and enlarging outwards. The strap-like ornaments on the stiles of the doors have their effect, too; but it is the crosses which give most distinctly the "tact" of the time.

It was an era full of "something rich and strange" in art, mingled with a certain hint of barbaric character which perhaps gives it part of its peculiar interest, and which would probably be discernible enough in the interior of St. Sophia if we could see it as it first left the decorators' hands. The building itself, one may say, was grand in conception, crude in execution; in its outward architectural treatment even clumsy. But it is the most remarkable and interesting architectural interior ever erected, and is at first completely probably the most wonderful in effect. We have only touched on a few of the many points in regard to it which are dealt with in the book before us. In fact, every page of the book suggests something of interest; there is no baddening in it; we only wish the matter had been a little more systematically and

readably arranged. But the book is an important and useful addition to English architectural literature, and is not without much matter for more general and popular interest.

NOTES.

THE Dean of Peterborough writes to the *Times* that the renowned west front of the cathedral has suffered severely during last Sunday's storm. Four of the pinnacles have been injured or destroyed; that is not of so much consequence—pinnacles can be replaced; but it is implied that the whole front may be in an insecure condition. This is a matter of national—we might almost say of world-wide interest, and we shall look anxiously for the result of the examination which is to be made by Mr. Pearson. If funds are wanted to render this grand front secure, the Dean will be fully justified in making an appeal, as he says, beyond the limits of the diocese; and there can be little doubt, we should hope, that it would be largely responded to.

THE case under the London Building Act reported in our legal column, in reference to Nos. 1 and 3, Church-street, Minories, raises a curious question, one of the many which will be likely to arise as to the interpretation of the Act. The question, as will be seen on reference to our report of the case, is whether, when a building has been more than half destroyed or pulled down, with the exception of the party-wall, the latter is to be required to be rebuilt as a new party-wall. In the first case in connexion with the site the building on one side of the party-wall was not destroyed sufficiently to constitute it a new building, and in that case we are of opinion that there was no ground for rebuilding the party-wall. But now notice has been given for rebuilding the other adjoining building, which had been destroyed for more than half of its cubic contents, and the District Surveyor claims that in that case the party-wall, though it has not been destroyed for half its area, must be rebuilt as a part of the new building. There was, it will be seen, a practical ground for the contention, as it is admitted that the party-wall is badly built. The magistrate, however, has ruled that Section 208 of the Building Act, which orders the rebuilding of a party-wall as "new" when it has been destroyed for half its superficial area, takes the party-wall out of the jurisdiction of Section 5 (6), which schedules as a "new building" any building which has been destroyed to the extent of half its cubic contents. The result of this would be that the party-wall is no part of a building! This, however, is directly contrary to the wording of the Act, in Section 5 (16), where a party-wall is defined as "a wall forming part of a building, and used or constructed to be used for separation of adjoining buildings belonging to different owners," &c., &c. There can surely be no doubt as to the intent of that, and very little doubt as to the legal force of the words. Section 208 appears to be really intended to provide for the case when a party-wall has been taken down to more than half its superficial extent without the adjoining buildings being taken down. The decision appears to us to be wrong both in regard to the wording and the intent of the Building Act, and we should doubt if it can be upheld.

WE have devoted some space to the Building Exhibition at the Agricultural Hall, as such large claims have been made for it, but we must say that we see no essential distinction between this exhibition and previous ones. The hall is rather better filled than before, the catalogue is more compact and was ready in time, but the exhibition is otherwise just what it was before; an exhibition for trade advertising, not for the illustration or advancement of

building construction or materials. In some cases we noticed what were practically the same exhibits of the same firms standing in the same place as last year; and wherever the visitor turns (especially if he is seen to make a note on the catalogue) there is the agent of the exhibiting firm on the watch to thrust prospectuses into his pocket. All this may be for "the good of trade," but it is absurd to expect one to think that it has any other aim or result. The only way to make a building exhibition that would be worth calling such, would be to restrict the exhibition to inventions or materials which have some novelty or special interest, and for a strong committee of architects, engineers, and master builders, to exercise control over the exhibits, having the right to reject any proposed exhibit they do not think worth its space, and to entirely prohibit touting and "circularising" in the building. An exhibition got up on these lines, say once in five years, would be really useful and interesting; but these shows as they are now managed are nothing more than advertising media. The lectures and conferences to be held during the exhibition may be of some interest; their dates will be found in our "Meetings" column.

A CORRESPONDENT, in our issue of last week, made a complaint against a District Council for the low salary paid to the Road Surveyor, viz., 120*l.* a year, from which it was assumed it would be necessary to deduct the cost of a horse owing to the large area of the roads. It is much to be hoped that the new District Councils, which now, in most counties, are becoming the Local Highway Authority (though in some counties the operation of the Local Government Act, 1894, has very injudiciously been postponed for three years), will pay their surveyors an adequate salary. At the same time it has to be borne in mind that the main roads, and, therefore, the most important roads, are under the control of the County Council, and that the keeping in repair of the ordinary county roads is not a thing which requires so much skill and large technical knowledge as common sense and careful supervision of labour employed. To take care that metal is put on at the right season of the year, to see that ditches are kept clear, and hedges properly trimmed, so as to let wind and sun play on the surface of the road, are not tasks which are beyond the power of any man who is capable or being a competent farm overseer. It has also to be borne in mind that the County Council may, and often does, give grants towards the roads which are not main roads so long as certain conditions are fulfilled, and it is the duty of the County Surveyor to see that these conditions are carried out. The really important highway functionary in rural England is now, in truth, the Surveyor to the County Council, and he cannot be too well trained or too energetic.

A REPORT on the working of the Richmond Main Sewerage Works, "for the three years ending March, 1894," has been prepared by Mr. Wm. Fairley, A.M.Inst.C.E., the Resident Engineer of the Sewerage Board. It is a clear and interesting statement, and affords further evidence of the magnitude and difficulty of the sewage problem, a problem which seems well-nigh insoluble. Certainly the treatment at Richmond appears satisfactory, purifying sewage to the amount of about 2,000,000 gallons a day (about 45 gallons per head of population), and that with a filter area of only 1½ acres. A system, however, which, besides the mechanical operations of straining and pumping, requires the addition to the sewage, *firstly*, of a small dose of diluted carboic acid and iron salts, *secondly*, of a dose of milk of lime, *thirdly*, of block alum and carbicularum (a compound of sulphate of alumina, carbon, and iron), and which further requires the filtration of the effluent and an expensive method of sludge-

disposal by adding lime, pressing into cakes, and carrying away by barge—such a system cannot be considered quite the ideal one. It is, however, an example of chemical treatment thoroughly carried out and giving satisfactory results.

MR. ARTHUR WRIGHT'S sliding-scale system of charging for the electric light, which has been used by the Brighton Corporation for over two years, has proved a success. In his report to the Electric Lighting Committee he shows very clearly the reasons which led him to propose the system, and that practice has entirely justified them. The conditions of the supply of electricity are quite different to those affecting gas. With gas, a comparatively small plant, kept continuously working, can store it economically in a gasholder, so that the plant is thus able to meet large demands for short intervals, for which it would be quite inadequate if the gas were supplied direct from the retorts. On the other hand, it is very much cheaper to make electricity as it is wanted and supply it direct than to store it for future use. In residential buildings the average daily time during which a lamp is lit throughout the year is from one hour to one hour and a-half; yet, during the other twenty-two or twenty-three hours, the electric supply station has to keep in readiness machinery capable of giving current to that lamp should the user require it. The company, therefore, require to have machinery capable of simultaneously lighting all the lamps connected to their mains. From this it is evident that it is not those customers who pay the largest meter bill that are the most profitable, but those who keep their lamps burning the longest. To encourage this deserving class, the following tariff has been adopted:—7d. per unit for the first hour, and 3d. per unit afterwards. The effect of this is that lamps are fixed where they are used for the longest number of hours, and are now found in passages and kitchens, whereas, formerly they were only used in shop-windows and drawing-rooms. In fact, a customer who uses the light regularly for more than two hours a day will pay less light for light than for gas at its present price. It is highly probable that many London companies will follow suit, and adopt a sliding scale. Bournemouth has already done so. The Corporation of Brighton are to be congratulated on their enterprise in initiating this system. During the two years working, their business has nearly quadrupled, and the revenue obtained per horse-power per year increased from 15s. 12s. 4d. to 16s. 8s. 4d. There was one of Mr. Wright's suggestions which the committee did not adopt, namely, "To abolish all meter rents, except to those customers who use the light on an average less than one hour per day throughout the year." Instead of this they resolved to reduce the rent of meters from 5s. to 2s. 6d. per quarter.

THE recent case of *Heffer v. the City of London Electric Lighting Co.*, reported in the March number of the "Law Reports," has made it clearer than ever that the Court of Appeal is disinclined to allow damages to be given to a plaintiff instead of the granting of an injunction, unless it is most clearly established that a sum of money will adequately compensate him for an injury done to his property. Considerable discussion has taken place on this point in the Chancery Courts in reference to infringements of rights to light, in which cases it has often been argued that damages should be awarded in place of an injunction. In the case under notice the injury was caused by the vibration of machinery. We do not propose to refer to the facts, but what Lord Justice Smith terms a good working rule, under which damages may be given instead of an injunction, is well worth quoting. He lays it down thus:—(1) "If the injury to the

plaintiff's legal right is small, (2) and is one which is capable of being estimated in money, (3) and is one which can be adequately compensated by a small money payment, (4) and the case is one in which it would be oppressive to the defendants to grant an injunction—then damages in substitution for an injunction may be given." It is obvious that in few cases, whether of the infringement of rights of light and air, or of injury by noise, can these several elements always be found, so that it must be taken that injunctions will be granted by the Court except in very exceptional cases.

WE have received some drawings of the alterations which are being effected at the Berlin Schloss, which serves as the town residence of the German Emperor. The deceased Emperor William I. used a modest residence in the main thoroughfare, Unter den Linden, and the Emperor Frederick never lived to move out of the Palace he held as heir-apparent. There is no doubt that the Schloss lends itself much better than any of the smaller Palaces for the purposes of the more ceremonial Court kept up by the present Sovereign. The large suites of reception-rooms and the Chapel Royal, which were formerly but seldom opened, are now more frequently used, and their vicinity to what may be termed the Imperial private residence under the same roof has great advantages. The block, however, required modernising, and in many cases improvements of an extensive nature, and these have been gradually taken in hand. The latest extensive alteration is the remodelling of the historical "White Hall," which was last decorated by Professor Stieler in 1844. The Court Architect, Herr Ihne (one of the foreign correspondents of the Royal Institute of British Architects), has carried out the work very successfully. The alterations included the remodelling of the grand staircase, and the addition of a *foyer* about 130 ft. long and 25 ft. wide.

TWO concurrent projects are in the field for rendering honour to the memory of Mrs. Siddons. It is proposed to erect a statue at Brecon, where is the house, latterly the "Shoulder of Mutton" Inn, where she was born on July 5, 1755. Many contributions have been made also to the fund where-with it is intended to place over her grave at Paddington a more befitting monument than the large flat stone which now marks the place of her burial. She died, in 1831, at No. 27, Upper Baker-street, until a few years ago the Portman Estate Office, and was interred in the "new" burial-ground at the rear of St. Mary's Church, Paddington Green. Close by may be seen the memorial cross erected to Collins, R.A., by his widow and daughter, the grave of Haydon, who ended his unhappy life at No. 1, Burwood-place, Edgware-road, and the site of the old St. James's Parish Church, built *circa* 1680. The church-yard, extending to about three-and-a-half acres, was opened to the public ten years ago, having been laid out at the joint expense of the Vestry and the late Metropolitan Board of Works.

PROFESSOR CHURCH'S Report to the First Commissioner of Works on the condition of the frescoes in the Houses of Parliament states that two pictures in the Peers' Robing Room are so far gone that he thinks "there is not enough of them left to admit of their being restored." Fifteen days have been spent in operations on the "Wellington" and "Nelson" pictures, of which Professor Church speaks hopefully, but urges that every effort should be made to maintain a uniform temperature of not less than 60 deg. Fahrenheit in the Queen's Robing Room and the Royal Gallery. This suggests an important consideration in regard to the future decoration of public buildings with wall paintings; for it seems that we may come to the position of inserting pictures which are at once so valuable and so

difficult to keep in repair that we may have to consider the building as a picture gallery, and make the preservation of the pictures the first consideration in regulating the temperature of the interior.

THE exhibition of works by Van Marcke, the late French cattle painter, at the Goupil Gallery in Regent-street, though small, is a typical and very interesting one. It includes works which show the powers of this able and masculine artist at his best. The solidity and thoroughness of his painting of cattle could hardly be more finely illustrated than in "The White Cow" (15), which seems to stand out as if alive in the landscape, and there is a unity about the whole composition which makes it in the true sense a "picture." "La Belle du Troupeau" (31), in which a dark-coloured cow stands in a shaded pool, has the same kind of pictorial unity, and in its tone and effect perhaps recalls more than any other work in the room the artist's master, as he called him, Troyon. "The Dun Cow" (34), another very fine work, Van Marcke no doubt to some extent sacrificed his landscape to his cattle; his dull greens and sometimes rather dirty skies are hardly Nature, but they fall into their place as the background to his cattle, which are the main objects of his study. There is one small landscape, however, "At Yport—A Quiet Afternoon" (30), which, though also subdued and unreal in tone, is exceedingly beautiful in composition and sentiment, a work that grows upon us as it is studied.

FROM a statement in the *Times* it appears that the proposed removal of the house in Poets' Corner and Old Palace Yard, which is a necessary prelude to the carrying out of any such scheme of a monumental chapel, has been talked of, is likely to be shortly realised. This we are glad to hear, for in any case the removal of the houses will open up a fine new view of the Abbey from the east. But we hope nothing will be done precipitately as to the proposed "chapel." Our belief is that the public do not want it, that it will be an excrescence on the Abbey, and that, even if built, burial within it will not be regarded, as a matter of sentiment, in the same light as burial in the Abbey.

BUILDING TRADES EXHIBITION.

In commenting on the various exhibits at the Agricultural Hall, it may be most suitable to commence with the raw material.

Bricks, and clay materials generally, formed a great part of the exhibition, and a number of firms we understand, employed Messrs. David Kirkaldy & Son to carry out crushing tests for the occasion. The results of all these are not yet available, but we may give the following statistics showing the greatest and least strain which the several bricks mentioned withstood. Six specimens of each kind were crushed; all were wire-cut.

Strength of Bricks.

Name of Firm.	Locality.	Description of Bricks.	Crushed Strain, lbs. per sq. in.	Lowest Highest
Mason & Watson.	Napton-on-the-Hill, nr. Rugby.	Light brown.	15,100	2,700
Gillingham Pottery, Brick and Tile Co.	Gillingham.	Red.	141,500	168,100
Ravenhead Sanitary Pipe and Brick Co.	Ravenhead, St. Helen's.	Reddish brown.	194,200	208,400
F. Jewson.	Erich, nr. St. Ives, Hunts.	Yellow.	94,500	117,800

It is usual in these cases to give the mean results, and to take them as indicating the actual strength of the bricks concerned, but we think more useful to quote the maximum and minimum stress as showing range of possible variation. We cannot allude in detail to the numerous brick exhibits; one was very much like another, but

the following stands attracted our attention:—Messrs. Ellis, Partridge & Co., of Leicester, had erected a polygonal structure, on which were crowded a miscellaneous assortment of fancy and ornamental bricks and tiles. The "Redbank" brand struck us as being uniform in tint, and speaking generally, there was an absence of cracks and flaws. The raw materials and firing of these goods must be very carefully attended to in their manufacture to produce such results. Messrs. Candy & Co., Limited, of Heathfield, Newton Abbot, have an equally imposing stand, on which, however, the materials are better arranged. The principal commodity was their channelled paving bricks, which have rather rougher surfaces than the majority of such bricks that have come under our notice—a feature distinctly in favour of the material. White and coloured glazed bricks, enamelled on the surface exposed outwardly when built up, vitreous stable-bricks, fire-bricks, terra-cotta, stoneware-pipes, &c., are amongst the numerous articles shown by this firm. They were all made from the kaolin or china-clay deposits in the neighbourhood of Bovey Tracey. The Stourbridge Fire Brick Company exhibit a large number of fire-bricks and tiles, stove-backs and linings, garden-vases, &c. Messrs. S. & E. Collier, of Grovelands, Reading, have built a small office on and around which the principal speciality of the firm—red tiles—are grouped. It was impossible not to notice that either these tiles were unequally fired, or the raw earth—presumably mortified plastic clay—was not very well prepared in the first instance; there is a lack of uniformity in tint, even on a single tile in some instances. The material is even, and devoid of spots, however, and the few bricks shown were creditable enough. Messrs. H. Bray & Co., of London and Nottingham, announce that their Fletton building bricks have withstood a pressure of 197.7 tons per square foot—a result hardly worth making so much of; the excellent quality of the materials is sufficient, though, to place them in the front rank. The Grays Chalk Quarries Company, Limited, of Eastcheap, E.C., have a small but interesting exhibit, consisting of divers kinds of bricks made at Grays, in Essex. One, which is stated to be non-porous, is extensively employed in the construction of cisterns and tanks, and possessed a singularly vitrified appearance. Other sets show various stages of firing in the manufacture of glazed bricks; and there was a window opening built of what were described as "decorated" bricks—the less said about the character of the decoration the better. Mr. W. Peck Taylor, of Chancery-lane, was putting up some brickwork on the top of which it is intended to place terra-cotta chimneys, each surmounted by a Gordon's wind-gauge, a useful invention. The Albion Clay Co., Limited, of Woodville, Burton-on-Trent, have a large exhibit of stoneware pipes, together with samples of the raw earths from which they are made, which are not fire-clays. Tests show that these pipes, 12 in. in diameter and 1 in. in thickness, are capable of withstanding a pressure of 4,741 lbs.; whilst those 18 in. in diameter and 1½ in. in thickness gave a result of 5,215 lbs. Messrs. Wood & Ivory, Limited, of West Bromwich, exhibit a number of Staffordshire blue bricks, &c. There were several brick-making machines in the bays.

Very few stands are devoted to cements and plasters. Amongst them is one by the Granite Silicon Plaster Co., of King's-road, St. Pancras, N.W., whose specialty, "granite" plaster is of American origin. Judging from its adaption in the Exhibition it is very hard; but a sample shown to us, set on an iron frame such as is used for partitions and the like, indicated that the plaster becomes rusty-coloured at and near its junction with the iron. It is especially useful for ceilings, lath partitions, and for lining brick walls. Messrs. Samuel Wright & Co., of Amhurst-road, Hackney, have a small exhibit consisting of a fibrous plaster column and capital, with sundry other samples of their work; and there are two or three cement-testing machines of ordinary patterns in the Exhibition.

The few stone exhibits present no specially interesting features, the materials shown being, or the most part, very well known. Messrs. Groves Brothers, of Milton-under-Wychwood, have a small stand of Taynton and Guiting stones; the former is noted as having been employed in the construction of colleges at Oxford. The materials may be described as shelly oolites of cream tint, the Guiting stone being the darker of the two. Judging from the balustrading exhibited, and which was said to be of stone from Taynton,

we do not think much of the material. It exhibited much false-bedding, or banding, the heavier-coloured streaks being shelly; a brown vein disfigures one face of the stone, and we should have to be convinced by better samples than we are on view that these oolites are of a very durable description. The Bristol Pennant Stone Firms, Limited, of Fishponds, have a number of tombstones, steps, &c., made of their carboniferous sandstone; the dark blue tones are especially suitable for sepulchral monuments, but when used as building ashlar Pennant stone has a very dismal appearance. Some of it is of a reddish tint, though this is not the prevailing colour at the quarries, a visit to which not long ago led us to the conclusion that any other tone than the dark, bluish grey was extremely variable. It is, however, a durable material. Mr. T. Freeman, of Phoenix-street, N.W., amongst other things, show some good building stone from the Beggar's Well and Battlestead quarries, near Alton, Staffs.; and odd cubes of stone, presenting no features worthy of note, are exhibited by two or three other firms. Of marble, we may point to the stand of Mr. S. A. Macfarlane, of Queen Victoria-street, on which are some carefully-executed trade carvings in Sicilian and other Carrara stones; a Celtic cross of some pretension which forms a prominent feature, would be better appreciated if it were not mounted the wrong way about. One or two small pieces of statuary were shown on serpentine pedestals.

Messrs. Arthur Lee & Brothers, Limited, of Bristol, show a large number of what might be styled museum specimens of divers kinds of marbles; the pieces are for the most part too small to enable one to judge of the real appearance of the stones; they were not very well polished and resembled stock exhibits, of a character conspicuously absent from this exhibition as a whole. The Bowstone Company, of Maidstone, have erected a small office of Bevis's Ashlar Building Blocks; and Mr. A. C. W. Hobman, of Bermondsey, shows a staircase in artificial stone of the same kind as at a former exhibition. The Plastic Marble Company, of Berners-street, W., have several examples of their goods, which are made to imitate marble; no one acquainted with that material, however, would recognise much resemblance between the real and the artificial products. The latter, in these examples, are made for the most part in flaring colours, and are, no doubt, suitable for certain purposes where the real stone would be out of place. Perhaps the most noteworthy artificial stone exhibit is that of Messrs. W. Garstin & Sons, of Kensal Green. It consists of steps made of chippings of Enderby granite and lead shots, bound together by Portland cement. The introduction of lead shots is the novel feature, and it is stated that these, which come to the surface of the steps in section, prevent slippiness, and so they do to a large extent. The shots are not distributed uniformly in the cement, but are confined to within an inch or two of the surface of the steps. In other examples shown, marble chippings were mixed with the granite, and there was a granite step having a number of plugs of lead let in near the edge.

In respect of sanitation there is not a great deal that is novel in the exhibition as a general rule, but the stand of the Albion Clay Company, Limited (No. 109), is a notable exception to the general rule. These exhibitors have especially turned their attention to the unsatisfactory state in which those modern features in house drainage—the intercepting and inspection manholes—are too frequently found after being in use for some time. In many cases, indeed, particularly in the event of a stoppage, these chambers are no better than cesspools, whilst it is quite a common experience to find them exceedingly filthy, and necessarily unhealthy. In the case of the intercepting manhole, Sykes's Patent Interceptor does away with the open channel; the trap is placed within the chamber, with two inspection openings, which are closed by screwed caps (Sykes's patent); this inspection is easy, the escape of sewer-gas prevented, and the too frequent trouble caused by the cap of the cleaning-arm in the ordinary type falling into the trap is obviated. Air openings to the trap are provided on each side, so that fresh air may be admitted to the house-drains, and, if desired, sewer ventilation provided. For inspection-manholes, improved forms of channel-bends are designed (Jones & Sykes's patent), which are bridged across the outlet-half, and slightly curved over from the top; the outer wall is also curved towards the inner wall of the outlet, and a portion of the bend next

the collar or socket is also bridged over and cut off at an angle, so as to conform better with the brickwork. These same exhibitors likewise show some excellent forms of street-gullies and yard-gullies, besides the now well-known "Paragon" Pipes and Sykes's patent joint-pipes. All these items are made of an exceptionally high grade of stoneware.

Messrs. George Waller & Co. (Stand No. 45) have an excellent show of various forms of inspection and other manhole-covers, sewer-ventilators, street-gullies, a capital cesspool-pump, pentstocks, tide-valves, and flushing-tanks, more particularly suitable for sewer-work.

Messrs. J. Duckett & Son, Limited (Stand No. 114) exhibit, besides various sanitary goods of ordinary type, their patent slop-water closet, in which a tipping-basin, holding three gallons, receives the slop-water from a sink, and discharges it to flush the closet, which is of latrine type. We are somewhat dubious as to the complete removal of soil, but where it is necessary to economise in the expense of plumbing, there can be no doubt that this is a valuable device. Duckett's self-cleansing channel-gully seems a useful form of this now generally-adopted accessory for sink and other wastes.

Messrs. Wm. Harrison & Co., Limited (Stand No. 162) have a good show of sanitary goods of the usual types, and their glazed supports for sinks are worthy of notice.

Messrs. Freeman Brothers (Stand No. 15) show some good forms of wash-down closets with Sharpe's patent flushing run. They have also some good connexions for stoneware traps and pipes to lead and iron soil-pipes, which are of screw form, and some useful connexions for lead and iron soil-pipes.

The "Aquarius" Patent Pedestal Closet, exhibited by H. Dakin (Stand No. 50), has a simple cemented joint for soil-pipe so arranged that the outlet can be turned for fixing at any angle.

Messrs. F. Richmond & Sons (Stand No. 28) make a feature of their brass connecting thimbles for the junction of soil-pipe and closet which are satisfactory, and admit of disconnection for cleansing or renewing closet. At the same stand H. F. Buchan & Co. show their brass traps for sinks, baths, and lavatories, which have the merit of side access for cleaning, and effect an economy in wiped joints.

Drain-cleansing apparatus is well shown by H. Hart (Stand No. 29), who stages a number of ingenious and necessary tools for this purpose.

A simple and nevertheless exceedingly powerful drain-clearing device is Cooper's Patent Suction and Vacuum Pump (Stand No. 30), which pumps up any obstructive substance, and also clears away the accumulated coating from which the interior of a soil- or waste-pipe is seldom entirely free. The pump consists merely of a wooden handle to which is attached a solid rubber disc, pierced with a series of holes, on each side of which are lighter rubber flanges.

Apparatus for disinfecting sewer air has an example in Arnold's patent deodorising apparatus (Stand No. 27), arranged to bring automatically together two chemicals in a liquid state, which by their reaction generate gases, having a powerful disinfecting and deodorising action on the sewer gases as they ascend through the apparatus. The "two chemicals" are not specified, but can be easily guessed. The apparatus is adapted for use in all kinds of manholes, whether in sewers or house drainage systems.

Another automatic disinfecter of a simple and useful kind, more particularly for domestic use, is Austin's porous disinfecter (Stand No. 27), which is no more than a porous cylinder filled with crystals of permanganate of potash, this being gradually dissolved by the immersion of the cylinder in the water of a cistern or other tank.

Whilst speaking of disinfectants we may notice Odamine, shown by Odams' Manure and Chemical Company, Limited, a carbolic preparation which is well spoken of by Mr. Ernest Turner and others.

An invention, which recent winter experience will commend to many householders, is the apparatus of the Anti-Freezing Air Valve Company, which is intended to shut off the supply of water to the pipes without emptying the cistern.

Of baths there are but few in the exhibition, the most notable being the steel-clad copper bath shown by the Sanitary Bath Company, Limited (Stand No. 60), in which the copper is protected by steel externally and tin internally. A cheaper bath is the enamelled steel bath, of galvanised steel, enamelled inside.

Shanks & Co. (Stand No. 1) also show several good baths, in which the salient feature is an

accessible waste. The same firm have likewise a good thing in urinals, made in one piece of earthenware; and exhibit besides some good examples of closets of modern type.

In the department of heating, the Gurney Foundry Company, Limited, of Toronto, exhibit (Stand No. 187), some of their heaters and radiators, which are admirable examples of well-designed and highly-efficient apparatus for heating on the low-pressure system.

Messrs. G. Shrewsbury (Stand No. 63) shows some examples of hot-water apparatus, of small size, suited for conservatories, and heated by gas, a convenient and even luxurious, if somewhat extravagant, method. The same exhibitor also makes a feature of the "Calda" water-heater for baths.

Mr. T. Polterton shows an ingenious form of zig-zag boiler for use at the back of an ordinary kitchen range, which thus utilising some of the heat usually wasted, assists in warming a house throughout by a system of hot-water pipes to which it is connected.

Another device, which is, to a certain extent, an improvement on usual methods, is Bushell's patent water-heater, in which, instead of a boiler, steam-piping is coiled around the kitchen fire in a manner somewhat resembling that adopted in the high pressure system of hot-water heating.

Messrs. Grunly's well-known system of warm air heating is represented at Stand No. 185.

Messrs. Charles Erith & Co. (Stand No. 120 B) represent the Smith ventilating fan, one of the best, if not the best, axial fans on the market; and also show their system of combined heating and ventilating apparatus, which has, before now, been noticed in the columns of the *Builder*.

Messrs. Baird, Thompson, & Co., Ltd. (Stand No. 78) exhibit their well-known ventilating appliances, and the equally well-known Blackman fan is shown at Stand No. 213.

Mr. J. F. Simmance (Stand No. 18) has on show his improved mica flap-protected outlets and inlets for ventilating pipes, whether for drains or for larger shafts, which are simple and well-adapted to prevent down-draught.

Under the heading of general fitting and finishings there are several exhibits which merit our attention.

Taking, firstly, door and window-fastenings and fittings, we notice the exhibit of the National Accident Prevention Company, Limited, and in particular their patent reversible sashes, enabling the glass to be cleaned from the inside. This can either be done by top-pivoting or side-hanging, both involve splitting the stiles, and consequently this joint is important; this company have a check-joint along the stile which sufficiently answers the purpose.

The casements in wood and gun-metal, invented by the same company, are a great advance on the ordinary methods. By means of a vertical revolving rod, extending from top to bottom of the casement, the same window can be made to open inwards or outwards, at the will of the operator; the frame revolving on a gun-metal pin above and below. In the case of a wooden casement, the revolving rod fixed to the frame is depressed by the stile friction-plates, thus allowing the casement to pass freely either inwards or outwards, yet forming a perfect water or air check. In a metal casement, the hanging stile has a corrugated brick, and works on a pivoted revolving corrugated rod, enclosed in a metal frame, allowing the casement to turn freely, a weather-proof joint being obtained by these corrugations. A water-bar projects over the upper and lower horizontal joint of the casement and frame. It is one of the most interesting and useful of the inventions.

Mr. E. G. Kendall's reversible window-sashes also admit, in a modified form, of the window being cleaned from the inside. Shurmer's patent sash and frame are also of this type, the sashes balancing each other without weights, the upper one can also be opened by itself as a casement sash at any inclination.

Whitley's patent windows, and those of the Simplex Window Fittings Company, Limited, are others on the same lines. In the latter the sash-fastener, instead of being on the meeting rails, is fixed at the side of the frame in a convenient position, and having a tall flush bolt. In this case also the top and bottom sashes are dependent on each other, no sash-weights being used; the top sash can also be inclined inwards at any angle as a hospital casement.

All these inventions show a great advance on the ordinary sash-frame. The only thing which we would recommend to the attention of inventors in this direction is an invention to enable the

glass of a double-hung sash to lie in one plane when the window is shut. The two planes of glass are always a disagreeable feature.

Coming to door-fittings, we notice especially Messrs. Kaye & Son's exhibit, in which good workmanship and material are evident. The "push and pull" locks are well-known to architects, but several new improvements are shown. Messrs. Kaye's automatic door porters are sunk in the floor and keep the door open, when necessary, by a rounded raised knob held in position by a spring. The patent automatic wedge-lock for the use of railway carriages, and which fasten the doors automatically by easy closing are an improvement. The panic or exit door-fittings for theatres, arranged to open by merely pressing against the door, have been adopted by the London County Council, and are in use at the Queen's Hall and elsewhere.

Comfort in a house largely depends on the satisfactory state of the locks and door furniture, and Messrs. Kaye have numerous contrivances for various forms of doors which we have not space to discuss here.

We turn to flooring, in which Messrs. Turpin have an excellent exhibit in designs of all kinds, applicable to parquet flooring, &c.; that for temporary use in ball rooms is of advantage. The wood-block floors by the same firm are laid in a bed of cement composition, and held in position by a projecting tongue and groove. The advantage of this system over the use of dowels may be fairly stated, in that the latter can be left out by negligent workmen. The Kaui Timber Company exhibit some specimens of this New Zealand wood which has a beautiful colour. No particulars as to price were forthcoming, but it has been used for paving with good results in England, and seems well adapted for all kinds of joinery and decorative fittings, being free from knots, of good colour, and straight grain.

The Linoleum Tile Covering Co. show their floor covering, in which the colours, instead of being on the surface only, are the same right through the thickness of the material, and consequently the linoleum shows no wear till the substance is worn right through—a decided improvement on the ordinary material.

Messrs. W. Garstin & Son's granito-plumbic paving consists in the introduction of lead in conjunction with several manufactured materials, such as granite siftings and Portland cement; the claim is that by its use steps can be permanently finished with a non-slippery surface. They have been used by the School Board for London. The principle, whether applied to granite, composition, or wood, consists of a number of holes bored in the front portion of the tread of each step, within $\frac{1}{4}$ in. of the riser, and these are then filled with lead.

Mr. W. Gooding exhibits his interchangeable rubber stair treads; they are useful for railway stations, and consisting of an iron, gun-metal, or brass frame, screwed on to the front portion of the step, and filled at close intervals by squares of indiarubber, which are noiseless, and easily refilled.

The Clifton artificial stone, by Messrs. Hohnman & Co., is used in steps, and declared to be non-slippery. It is made in various designs and colours tending to marble imitation. As a material, no doubt, it is excellent, but we should prefer if it could express itself without imitating a natural material.

In the fireproof-floor section we note the interlocking flooring of Messrs. C. G. Fickling & Co. It is a hollow tubular brick floor, each tube consisting of two cavities; the feature claimed is the large amount of hollow space compared with other systems, and the consequent smaller quantity of concrete filling used, and the greater resistance to the passage of sound. The blocks themselves will, it is stated, carry a safe load of 5 cwt. per foot super, without the aid of concrete. Messrs. Potter & Co. also exhibit their fireproof floor, the steel joists are enclosed with burnt clay flange shields provided with air spaces, and stretching from each joint is a corrugated iron permanent centre in an arched form, on which the concrete is laid. Variations for different classes of work are shown, and the inventors claim that the cost does not exceed that of ordinary flooring.

Coming to roofings, we notice Messrs. W. Edgecombe, Rendle & Co.'s exhibit. Their invincible system of glazing, attached or not to a wooden sash bar, dispense with the use of putty, and water-channels and condensation-gutters are properly supplied. The roof-tilling exhibits are exceptionally good, both in workmanship and colour. Messrs. H. J. and C. Major, Limited, have a tastily-designed little pavilion into which their various manufactures

are worked. We noticed especially their patent interlocking tiles, which are securely laid without nails or mortar, and are useful in exposed positions, the underside being provided with water checks for driving rain. These tiles of Somers make are claimed to be lighter than Broseley tiles, and have a better weathering face.

Of fireproof partitions we notice especially Pease's system of interlocked tubing, consisting of thin metal sheeting bent to circular tubes of different sizes, and fitting into one another: they are then filled with concrete. The tubes can either be fitted together as partitions, or walls, or horizontally as flooring, forming a permanent centering for the concrete. It is useful for columns, in which later capacity they favourably impressed us for interior work, as they can be made of bronze or brass, and form a series of cylinders touching each other.

The use of silica cotton as a sound-proof material is well shown in Messrs. Fred Jones Co.'s exhibit.

The Fireproof Construction Company exhibit their hygienic hollow-block fireproof partition 2 in. in thickness. They are composed of slat about 5 ft. 6 in. long, 10 in. deep, and 2 in. thick. They are pierced in the direction of their length with hollow cylindrical spaces, and are held together by Z clamps fitted into a saw-cut. Being only 3 in. thick, with plaster finish, they should supersede the old 6 in. brick partition as they are useful in confined spaces.

The Granite Silicon Plaster Co. exhibit the specially, an artificial stone composition designed to supersede ordinary lime-plastering in interior work. Its properties are hardness, quickness of drying, and an almost polished surface; it is also non-absorbent. Internal plastering of our houses has undoubtedly not kept pace with the hygienic activity in connexion with other fittings, and seems that in some such form we shall certainly find an advance on ordinary "render, float, and set" work.

There are few exhibits of improvements in paints. The Copal Varnish Co., however, are an exception. It is well known by architects that produce a pure white-painted surface which will keep its colour while lead is not applicable, as a short time it becomes yellow through taking oxygen. To remedy this "Paris white" Japan consisting largely of zinc, has been produced which, it is claimed, has properties of permanent whiteness. It is a small subject, but one which many architects are interested in.

In connexion with grates and fireplaces few exhibits deserve attention. The patent self-cleaning range by Messrs. Yates, Haywood & Co. has been used in the artisans' buildings erected for the Guinness Trust. The chief point is the ease with which the flues are cleaned by removing the oven. The Quadrant kitchener, by the same firm, has a self-adjusting, lifting fire, which is raised or lowered by one hand, and over- or under-draught ovens can be made with enclosed iron flues.

Mr. James B. Petter exhibits the "Nautilus grate"; it is, in fact, a fire-brick-lined, slow combustion, portable dog-stove, for use in open places, in which the products of combustion revolve within a volute-formed top, passing through into a flue leading into a chimney, the smoke being automatically consumed by being drawn over the incandescent fuel at the base. The grate is fitted on wheels, and thus easily removed in summer.

Cresswell's Patent Asbestos Curfew Curtain revolving fireproof curtain placed in a brass frame under the mantelpiece, is useful as a blower for being pulled down at night to prevent possibility of fire sparks setting light to building.

In conclusion we would merely mention a beautiful turned balusters shown by the Clapp Steam Joinery Works; some of these are of good design, and the prices at which they can be produced is somewhat astonishing, and due entirely to improvements in this class of machinery.

In the department of electrical work, Messrs. Riley & Co. show specimens of the "intel conduit" or "tubular" system of wiring which has come into extensive use in the States. The advantage of this system will be appreciated by architects, who often find it difficult to deal with the ordinary wood casing in which the electric wires are placed. Very rarely is the casing moulded to suit the decorations of the room. We have occasionally found it placed under floor. This is objectionable electrically because of the danger of water upset on the floor entering the casing, or of nails through the floor touching the conductors. Rats, also, in old houses or trouble by eating the insulation of the conductors.

Another bad practice is to put cables through holes in the wall and fill the space round with Portland cement, which, after a time spoils the insulation.

The tubular system gets over all these difficulties. The twin cables are put in a tube made of a kind of papier-mâché thoroughly treated with bitumen. The tubing, which is waterproof, can be had covered with a layer of any kind of metal, either to protect the cables or to match existing fittings. The ends of the pieces of tubing are fitted with brass sockets, which can be jointed in less than a minute. Ordinary gasfitters' tools can be used advantageously in installing this new conduit.

In the States, where there are hundreds of miles of it in daily use, several—if not all—the insurance companies pass it. In Keith's New Theatre at Boston, which cost over 120,000*l.*, ten miles of brass armoured conduit have been used in the installation. We do not see why this new system of wiring should not have a great future, as it is safe, and cheap, and, from the electrician's point of view, it has the great merit of giving ready access to the wires.

Amongst other electric exhibits, Callender's Bitumen, Telegraph and Waterproof Company, Limited, show samples of the Callender-Vebber system of conduits for electric mains, and also of the Callender "solid" system. The great advantage of the former system is that if a sufficient number of ducts are formed at the beginning, no extra expense and trouble can be caused later on by having to open the streets to lay new mains. The latter system is of a very substantial character, and looks as if it would last indefinitely. It is in use at Liverpool and Bath. The joints are made in special boxes, samples of which are shown. The boxes have double walls, the space between them being filled with bitumen in order to prevent moisture getting in.

The Blackman Ventilating Co., Ltd., amongst other exhibits, show a continuous current motor and fan combined. It runs at 500 revolutions per minute, and displaces 3,000 cubic feet of air. Taking electricity at 6*d.* the unit, the cost of working would be under a penny an hour. They have already supplied the Houses of Parliament, and many smoking-rooms and business premises in the City, and claim that their alternating current motor fan gives every satisfaction, being self-starting, and requiring very little current.

Of decorative or artistic work there is not much which it is necessary to notice from that point of view. We may remark on what is rather a new feature in these exhibitions in the shape of a stand of drawings lent by the Institute of Architects—certain drawings of St. Peter's, St. Paul's, &c., which are pretty well known to the frequenters of 9, Conduit-street; and also an exhibit of the Corporation of London, consisting of a number of drawings of their principal buildings, models of the Council Room at the Guildhall, and of the Guildhall roof, and a small drawing, (dated 1865), showing Sir Horace Jones's idea for a Municipal Court and offices, forming a quadrangle in front of the Guildhall, with an arched opening into Cheapside. Messrs. Minton's tile exhibit shows some tiles that are agreeable both in colour and design; we approve of the rather delicate tints employed.—Messrs. Webb & Co. show some good and rather original tiles. Mr. H. Hermann exhibits some wood carved panels, the special point in which is that they are almost entirely cut by machinery, but finally finished by hand; thus getting some of the economy of machine labour, while avoiding its purely mechanical result. Some specimens should have been shown giving a panel as it came from the machine, so as to give a definite idea of the extent of hand-work in it, and of what the machine could accomplish.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS:

SOUND IN ITS RELATION TO BUILDINGS.

The ordinary meeting of the Royal Institute of British Architects took place on Monday last, at 9, Conduit-street, Mr. James Brooks (Vice-President), in the chair.

Mr. W. H. White (Secretary), announced the decease of Mr. Ernest Turner, elected Associate in 1867, and Fellow in 1877; also of Mr. Hubert A. Gregg, elected Associate in 1887, son of Mr. Ebenezer Gregg, and a young man of great promise.

The Chairman announced that an intermediate examination to qualify for registration as Student,

was held on the 19th, 20th, 21st and 22nd instant. Applications were received from seventy Probationers, including those relegated from previous examinations. Of these, fifty-six were admitted, and fifty-four presented themselves and were examined; twenty-eight passed the examinations, and twenty-six were relegated to their studies. The names of the successful students, placed on the paper in order of merit, were as follows:—

John Ormrod, Bolton; Ernest William Marshall, London; Thomas Anderson Moodie, Hillhead, Glasgow; Thomas Spiers Fraser, Glasgow; Ernest Jesse Mager, London; Tom Norman Dinwiddy, Greenwich; Victor Evans Bosher, St. Leonard's-on-Sea; Herbert Haines, Bedford; Frank Ward, Bradford; Louis Moore, Southampton; William Stanley Bates, Bedford; Percy Bown, Harrogate; James Henry Coram, London; William Alphonsus Scott, Drogheda, co. Louth; Alexander Godolphin Bond, B.A., Bristol; Wallace Stevens Jones, Bristol; Arthur James Ecclestone, Great Yarmouth; James Stockdale Harrison, Leicester; Hugh Alfred Ellis, Manchester; William Vincent Morgan, Carmarthen; Arthur Reutlinger Gough, Redland, Bristol; George Herbert Manning, Harlesden, N.W.; James Edward Coleman Shield, London; John Arthur Smith, London; Edward Hale, King's Norton, Birmingham; Stanley Edward Knott, East Barnet; George Westcott, Old Trafford, Manchester; Rupert Claud Austin, Cambridge.

Mr. H. W. Burrows then read a paper on "Sound in its Relation to Buildings," of which the following is an abstract:—

Mr. Burrows, in his opening remarks, said that without professing to put before the Institute any new views in the treatment of the complicated science of acoustics, he should endeavour to pass in review some of the principal later writings contained in scientific treatises and technical journals, dealing with the science entirely from an architect's point of view. The form which a building should assume to insure acoustical success was a question upon which much difference of opinion existed. Simplicity of plan was not of necessity good for acoustics, square rooms being often found to be defective. Most authorities condemned flat surfaces, as reflections took place in the right angles of such apartments, at the floor, walls, and ceilings. It had been found of advantage in such cases to cant off the angles of rooms, or to curve the ends, or to place the speaker near the corner of the room, so that he addressed the audience diagonally. Some writers considered that if rectangular rooms were adopted they were improved if one dimension was longer than the other. Sound-waves being propagated in spherical layers from their point of origin, curved forms had been recommended, but opinion was not unanimous on this point. Of buildings having a circular plan, St. Paul's was a well-known bad example; but this was mainly due to the close proximity of the speakers to the walls. Another effect would, no doubt, be produced if the speaker were situated in the centre of the circle or near it. Certain inconvenient acoustical effects met with in buildings of circular plan were not experienced in those where the walls were broken by a large number of deep embrasures. Polygonal buildings gave varied results. The Westminster Chapter-House, octagonal on plan, with central clustered columns and vaulted roof, was stated by some writers to be bad acoustically. On the other hand, the old Surrey Chapel, a sixteen-sided room, with a gallery and hemispherical roof with lantern light, had been quoted as a very successful building for its purpose. The Albert Hall, London, a building of the oval or ellipse type, had been almost universally condemned. Before it was built failure was predicted, as the reflections from such a form were known to be concentrated in the foci of the ellipse, and this, together with its vast size, form, and material of roofing, had combined to produce a great acoustical failure. The amphitheatrical type of plan had proved successful in many instances, but some notable exceptions, chiefly by reason of excessive sonorosity, were referred to. Other types of plan were those in which the end was more or less curved, and the sides produced somewhat after the plan of the basilica. The L.C.C. Council Chamber, an example of this method of planning, was considered to be an acoustic success. One writer proposed to terminate rectangular halls with a parabola, and give a parabolic form to the roof over the platform. It was objected, however, that all sound originating in the body of a hall might be concentrated in the focus of the parabola, so that great difficulties presented themselves in dealing with a curved surface of that nature.

Among buildings planned as elongated rectangles with rounded ends which were successful acoustically was mentioned the Queen's Hall, Langham-place, a noticeable feature of which was the truncated, trumpet-shaped orchestra. The horse-shoe type of plan, largely adopted for theatres, had been attended with but varying success, depending much on the materials used in construction, and largely influenced by the boxes, which according to one writer were favourable to the laws of sound, and according to another monster traps for strangling it. Various examples were mentioned of what the author termed a composite type of plan, in which the walls at the rear of the speaker or orchestra were formed as a truncated pyramid, diverging outward, with the seats arranged in a semicircular or other curve. In churches and cathedrals, the avenue type of plan had been criticised because the columns which carried the arcades caused sound shadows, and were therefore objectionable. A reverend writer had attributed the acoustic excellence of Magdalen Chapel to the T-shaped plan—choir and transepts, without a nave and without aisles. The same writer considered that with a T-shaped church, the choir separated from the transepts by a light screen, and the organ placed behind a reredos at the extreme east end, an ideal result aesthetically and acoustically would be obtained. With regard to the influence the section of structures had on the propagation of sound, most writers agreed that smooth surfaces reflected sound, while broken or rough surfaces dispersed or absorbed it, so that in some instances it might be found advisable to break up the ceilings with rafters, or to form recesses or projections in the walls. A chief consideration in this connexion was the size of the room. As to the form of ceiling, various conflicting opinions were quoted and examples cited, it being generally agreed that right-angle junctions between walls and ceilings were bad, as confusing reflections resulted, to obviate which some form of cove had been usually adopted. The difficulties presented by concave curves were shown by the failure acoustically of most domes or cupolas, due usually, it had been said, to the powerful and prolonged resonance produced. To prevent the loss of sound upward it was probably best to keep ceilings moderately low, consistent with good proportion. With regard to the dimensions of a building, what was known as Harmonic Proportion was strongly urged by many. For good acoustic properties, it had been maintained that a building should be so constructed that its different dimensions should be in some simple relation to each other; this was illustrated by a well-known analogous effect in music. A list of successful buildings showing the value of harmonic proportion was quoted by the author from a paper by Mr. A. F. Oakley, who mentioned that in one case he had cured the acoustic defects of a room by the introduction of some shelving on which books and periodicals were stored. Concerning the influence of construction and materials on the acoustic properties of buildings, the greatest possible differences existed both among architects and scientists. The varying requirements of buildings partly accounted for these divergent views. Where resonance was demanded, the most elastic materials were needed, while in others less elastic substances might suffice. The results of a series of interesting experiments with wood, slate, tile, and plaster, recorded by Mr. Fletcher Barrett, and some valuable observations by Mr. Oakley on the choice of materials, were here referred to, followed by a summary of the recommendations of the Congress of Architects and Engineers which met in Italy in 1880, when the question of the employment of wood in theatre construction was discussed especially in relation to acoustic effects. Advocates of a more solid type of construction and material had spoken well of concrete for floors of concert-rooms and lecture-halls, buildings constructed of fireproof material, of iron and concrete, having been pronounced to be wonderfully resonant. Fibrous plaster had also been adopted with success; but the most reliable material to produce a satisfactory resonance when required was undoubtedly wood, and that by preference fir. In treating of heating and ventilation and their effect on sound, the author dealt with the experiments and researches of Professor Tyndall and others on the subject of the acoustic properties of the atmosphere, and described in detail the results of an elaborate series of experiments carried out by Mr. W. W. Jacques, which went far to show the extreme importance of good ventilation in regard to the acoustic qualities of buildings. A series of tests at the Baltimore Academy of Music had proved

that the almost perfect acoustic properties of that building were largely due to the condition of the air, and not to the plan, or to the materials of which the building was constructed. The direction of the ventilation was of little or no moment, for it had been demonstrated that sound was heard, not only with the wind, but often much better against it, and, better still, across it. The principal office of ventilation in its acoustic bearings seemed to be that it rendered the air free from those acoustic clouds which disturbed, diverted, modified, or absorbed sound-waves, as atmospheric clouds modified or destroyed light. The key-note of rooms was next considered. A recent writer had pointed out that a hall built of masonry had a different note from one constructed of timber, or largely composed of that material. Another, speaking of the sensitiveness of the old Salle de Concert at Paris, asserted that the wood lining of the hall had become, like an old violin, well seasoned and tuned to respond readily to the vibrations of both voices and instruments. With regard to the various remedies suggested to improve acoustic defects, cushions, furniture, &c., as was well known, deadened sound, and thick draperies on walls prevented or greatly modified echoes. At St. Paul's Church, Boston, it was stated, the preacher could only be heard when the church was decorated. A beneficial effect had resulted from the presence of an audience, the addition of shelves filled with books and papers, the use of a *velarium*, flags and such like hangings, venetian shutters, sounding-boards, &c. The use of wires and cords had been recommended, and at times stated to be successful. In conclusion the author referred to the bygone use of acoustic vases. Mr. St. John Hope had questioned the theory that they were inserted with a view to augment the sound of music. Considerable resemblance seems to exist, however, between some of the acoustic vases and the resonators devised by Professor Helmholtz. Any volume of air contained in an open vessel, if caused to vibrate, yielded a certain note, and when that note was sounded in its neighbourhood it tended to strengthen it. It was much to be regretted that so many of these acoustic vases had been either removed or destroyed, as the opportunity had been, to a great extent, lost of testing their value or otherwise for acoustic purposes.

Professor Roger Smith, in opening the discussion, thought they must be very much indebted to the writer of the paper for having gone into the subject so thoroughly, and having produced such a large series of facts and statements. To his mind the most interesting part of the paper was that dealing with the condition of the atmosphere in rooms. A good many other points had been more or less raised before, but this he believed was a comparatively new point. There could hardly be a doubt that, unless the condition of the atmosphere in a building was homogeneous, there must be some difficulty in the radiation of the sound. This suggested rather a new idea, as to the possibility of improving hearing in theatres and places of the sort, and the necessity of preserving the atmosphere at a tolerably uniform temperature. If this could be carried out, it would be an exceedingly interesting result. To a certain extent, every building was an experiment, and it would be well if the Science Committee of the Institute, under whose auspices this paper had been read, could secure a collection of observations upon interiors, their dimensions and materials; whether they were successful for music and for speaking, for the two things were very different; and if they were not successful for either one or the other, whether they were uniformly bad, or bad in one place and good in another. Such observations, if tabulated with regard to a considerable number of known buildings, and by careful observers, would doubtless throw a little light upon what was undoubtedly a very obscure subject when one came to apply it. Mr. Burrows had quoted the opinion of one gentleman, who considered that Her Majesty's Theatre was bad for sound; but that he considered was a mistake, for it seemed to him that music had never sounded as it did there. He was not sure, too, whether the Albert Hall deserved quite to be called a failure. A building where six or seven thousand people could hear music successfully, could hardly be called a failure. There was, no doubt, a considerable amount of echo, but in the early stages of that Hall, when it was full of timber scaffolding, it promised to be a wonderful place for sound. When this mass of timber was taken down, the echo from the roof was found to be great. His own impression was that the echo

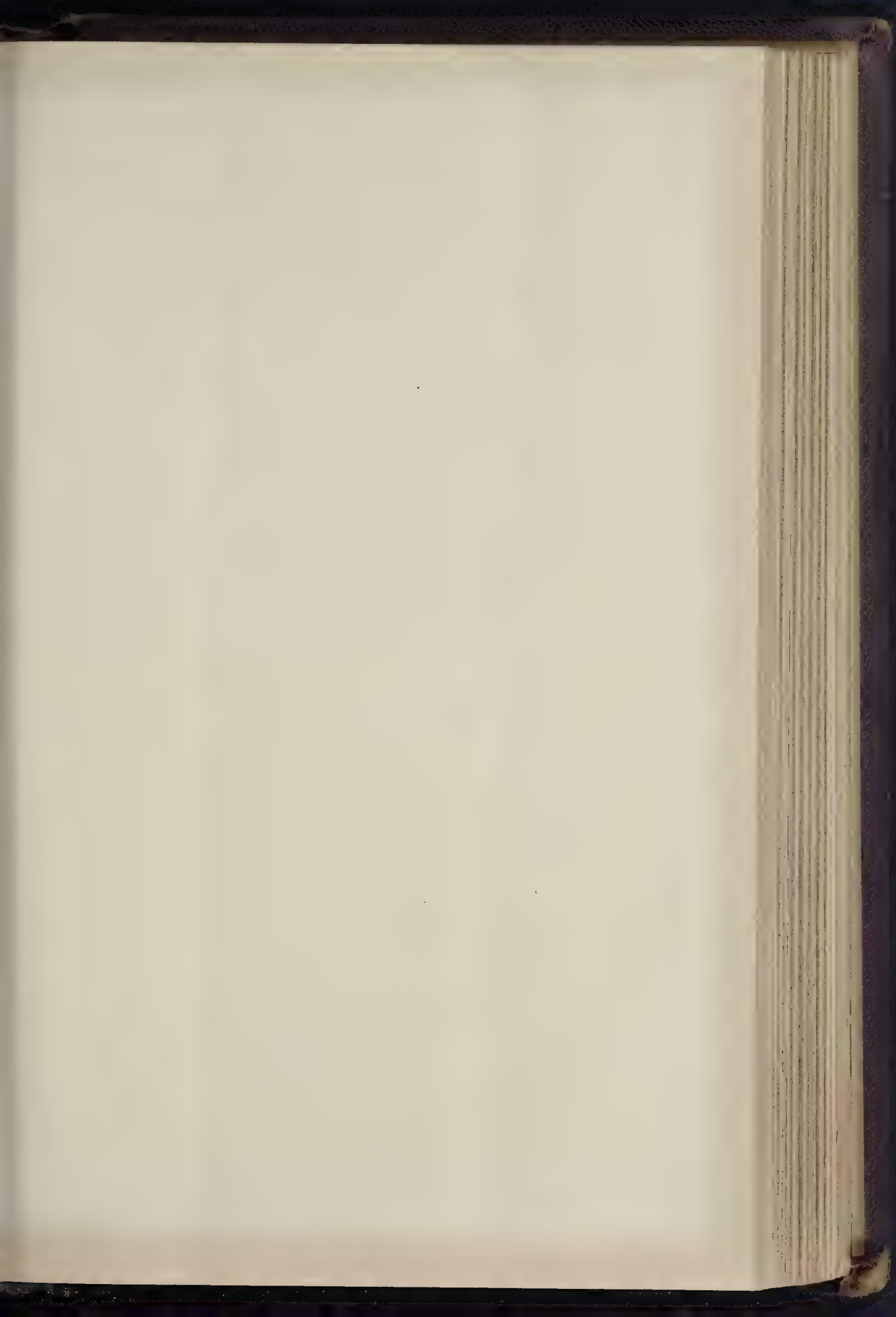
did not come from the glass of the roof but from the large cove. With regard to another elliptical building where an echo was found, he had an opportunity of tracing the actual lines which sounds from a certain point would make, if they went up to the cove and were reflected down. He found that they followed a certain line, forming almost a ring on the floor, and occupying that portion of the floor where there was difficulty in hearing. Therefore, no doubt the echoes which, notwithstanding the introduction of the *velarium*, were to some extent still heard in the Albert Hall were due more to the cove than to the glass of the ceiling. Mr. Burrows had not said quite as much about echo as it deserved, and he (the speaker) would rather like to say a few words about echoes in rooms. Such experience as he had had in endeavouring to unravel the defects of rooms where there was a difficulty in hearing, led him to believe that, of the two things—excessive resonance and echo—the latter was the more troublesome of the two. The place where the greatest difficulty in hearing was experienced was where there were bare flat walls, against which the speaker's voice could impinge, and where the sound was reflected level to the ears of some of the audience. Mr. Burrows had referred to one of the lecture theatres of University College. At that college there were two theatres, one being above the other, but in the lower one the echo was more distinct. This was formerly a very good room for hearing, the sloping seats being high, and covering up the walls. The authorities of the college, however, thought it desirable, for reasons connected with safety in case of fire, to alter the room, and give it a flatter slope, so that since then it had been infested by an audible echo. His impression was that a less distance than 55 ft. quoted was quite sufficient for the purpose, and he had formed an opinion that if the difference between the direct path of the sounds from the speaker to the hearer, and the length of the reflected path—supposing it was reflected from the wall—if the difference was more than 40 ft. an interference from echo was perceptible, and when it became a little more than 40 ft. it was very perceptible. Consequently, in a room not more than 20 ft. across a man might hear the echo of his own voice. The presence of flat, bare surfaces made good reflectors, and the putting of columns in front of them was one of the best means for insuring freedom from echo. Resonance was a thing it was very difficult to deal with. There was no doubt that up to a certain point resonance was an advantage, and where music was only to be considered an extraordinary amount of resonance could be enjoyed. In such a place as Westminster Abbey or Canterbury Cathedral a wonderful amount of resonance in the atmosphere was a striking feature, for if a chord were sung by the choir, after the voices had ceased, one might hear it, as it were, resounding up above for several seconds. No doubt it required a very skilled speaker or reader to speak or read in a church of that sort, without disturbing the resonance. At the same time, a very large number of persons could hear very distinctly in Westminster Abbey, and it was certain that a great amount of resonance could be tolerated, especially if the person speaking or reading knew how to manage and modulate his voice. He concluded by proposing a hearty vote of thanks to Mr. Burrows for his excellent paper.

Mr. Tavorer Perry remarked that he had had occasion to build a house on a very exposed part of the coast, and he built it almost entirely of concrete, filled in between brick sections. A year afterwards he asked the proprietor if he were satisfied with it, and was told that the only thing which troubled him was resonance, and especially in a gale. From that he learned a lesson, and two or three years afterwards, when he had to build the Alhambra Theatre, he constructed it of concrete, the result being eminently successful.

Mr. H. H. Statham, in seconding the vote of thanks, confessed that he had not studied the subject from the scientific point of view of acoustics, but he was rather consoled by the reflection that all those who had differed from each other. He merely desired to make some remarks on observations made by himself during a great many years as to the effect of public buildings in regard to music. He would confine himself to that, because it was the point to which he had given special attention. In the first place he would say that he quite agreed with the opinion quoted in the paper, to the effect that a building might be very good for speaking, and yet extremely bad for music. A building

which might be good for one person standing at a particular point, might be quite unsatisfactory for a number of persons to be heard together. There was a good deal of confusion of idea in regard to resonance. He was well acquainted with one building which produced very strong echoes, viz., St. George's Hall, Liverpool, and which was entirely composed of hard materials with granite columns and cement walls. A wooden floor had been put down, but still all the walls were composed of hard materials. The echo, when the organ was being played, was tremendous, and the eminent organist there one day remarked to him that the Hall no doubt "helped the organ very much," meaning that it helped the tone: there was a grand roll after a chord was struck. But what might be called the design of musical composition was another thing, for in that case echo was not wanted. In St. George's Hall, as in the cathedrals, there was a grand effect on striking a chord, but in playing one of Bach's fugues there was a muddle from the echo. So that when some people were carried away with a desire for resonant effect, they were spoiling the effect of complicated music. A hall which was very much upholstered would prevent an echo, and such a room would be good for clearness of effect in connexion with instrumental music. The complaint made by singers, however, was that it did not help the voice. In another hall which was exceedingly upholstered, there was no echo, but one felt that the singer wanted some help. He thought the Albert Hall a very good building for sound, considering its great size. He understood that the echo there was very bad before the *velarium* was put up, and he doubted the curve of the roof with its glass and iron was simply a reflector to focus the sound down. Since the *velarium* had been put up the echo was much less than it had been before, but it was impossible in so large a building; but it was impossible to get rid of echo when a hall was so large that sound took an appreciable interval to travel along it and back. Then, again, it was the wrong shape. It was a general rule in connexion with all halls for music, that the audience should face the performers. The trumpet-shaped orchestra of Queen's Hall had practically proved a success, for having attended the Philharmonic Concerts in St. James's Hall for many years he found that in the Queen's Hall, which held about one-third more people, he could hear as well. Reference had been made to Dr. Parker's Temple, and he could bear testimony as to its being a good room for music, from his observations at an organ recital given there, and the clearness of definition with which rapid passages were heard. It might, therefore, be well to find out the reasons for that. There was no doubt true that by arranging rooms according to certain harmonic proportions they could be made to respond to a certain note. But they came back to the old difficulty of what was good for a single voice and what was good for an orchestra. It was very convenient for a public speaker to find that, by pitching his voice to a certain note, he could make himself heard; but in the case of music there were not kept to one note, and nothing was more annoying than listening to music—and occurred especially with the organ—and finding one particular tone of the instrument strongly reinforced by the room. He had heard this over and over again in cathedrals, and so far from being an advantage, it was in reality a nuisance. So that the plan of a building, in regard to getting a particular note, could only be successful where it was wanted for public speakers alone—music demanding so much more. As to materials for the walls of buildings, it appeared to him that wood and fibrous plaster were the best for reinforcing and helping the sound. His experience had been that all substances which reflected light sharply reflected sound sharply; so that in lining a room the should look to those substances which would help the sound without reflecting it back again, these being wood and fibrous plaster, and especially a hollow lining of wood. The paper was a useful one, as bringing together a great many things and experiences; and it might suggest further experiments and operations.

Professor Atchison remarked that Mr. Burrows had referred to the opinion of the Astronomer Royal as to the Whispering Gallery at St. Paul's, and he should not like to give a strong opinion of such a subject against so eminent an authority. But precisely the same effect was to be met with in what was called a square at Leeds, where there was a 10 ft. wall with a garden, and which was divided into four quadrants by four streets. If any





Waters

NATIONAL OPERA HOUSE



THE PHOTO. SPRUELL AND F. A. SCHUBERTH. STREET FETTER LANE. EN.

LATE HERR VON IBYL, ARCHITECT

one stood at one of the angles and whispered, a person at the opposite angle could hear distinctly, although perhaps not so strongly as at St. Paul's. He, therefore, thought the dome could only have a little to do with it, and it must be mainly owing to the curvature of the walls. Sir Christopher Wren, who had a great deal of experience in arranging all sorts of buildings, and places particularly for hearing purposes, gave as his opinion that 50 ft. in front of a speaker, 30 ft. on each side, and 20 ft. behind him, were very convenient distances for hearing. When he was quite young to the profession, he remembered an alteration being made at Exeter Hall, to make it more convenient for music. There were large lanterns, and it was doubly columned. Musicians were of opinion these might be done away with, and an architect of some eminence was called in, who proposed that a segmental ceiling should be put in. This was done, but he could not tell the effect of it, though it was generally believed by musical people to be a great improvement. He recollected an axiom about echoes, which was, that if any room was made in the shape of a double cube, there was sure to be an echo. When in Italy he remembered visiting a church in the Romagna, in the nave of which there were seventy-one echoes. Each arcade, he believed, was square, a double cube in shape, and with a dome at the top. He had never heard much speaking in such a place as a chapter-house, with central column, but there was one example his ears were more familiar with, and that was as a dining-room with a ventilating gas-burner in it. He had noticed frequently that in the case of persons who sat at the two ends of the table, especially if they lifted up their heads when speaking, it was almost impossible for a person at the other end to hear what was said. Mr. Burrows had referred to amphitheatres, of which there were a great number, but he was not aware that they were ever used for speaking in. They were all familiar with the "Morituri te salutant" of the gladiators, but that appeared to have been the only speaking that took place in an amphitheatre, except the jokes banded from the lower part of the hearers to the Emperor. The speaking theatre was a semicircle, and amongst the Greeks there more than a semicircle. At the back of it there was the wall scene. Almost all the remarks at had been made as to materials were contained in Viruvius's account of the theatre and of the uses. Viruvius considered that, in the case of theatres fitted with wood, there was no occasion for anything else, on account of the resonance, and when the theatres were built of stone or used with marble, it was necessary to put up these vases for reinforcing the sound. These vases had been repeatedly referred to at the meetings of the Institute, and in books, as if they were put only for ornament or amusement. That seemed him, however, impossible, for the most distinct account was given as to where the vases were to be, and the exact tone to which they were to be attuned, and that, when the theatre was large, there were to be three rows of them. In various parts of the world these vases had been and *in situ*. It seemed, therefore, absurd to suppose that persons so acute as the Greeks and Romans would have had such things if they had been of no use. When they considered that there were thousands of people who appeared to adore music in England, it would be worth their while to subscribe sufficient money to get these vases, and see what the effect would be, in enabling large bodies of persons to hear when music was being performed. As far as he could make out, the theatres of the Ancients were used for what would now be called operatic performances. Most of them were acquainted with the plays of Terence, in which it was stated that the music was composed by a certain person, and performed on double flutes, to the right and left hand. The clerical critic to whom Terence has been made seemed to think that architecture was as easy as composing romances. He (the speaker) presumed that in the times most of the service was chanted, and he could only hope that the experiments that gentlemen proposed might be tried. If they were not successful, he would then see that it was not so easy to make a place answer the purpose most directly for music and for sound. They knew very little about acoustics at present. It was impossible to say that anything more or less like anything else would have the same effect. As an architect did not desire to make each church an exact copy of another, the effect of its acoustic excellence might be different, although mainly founded on another form which had answered the purpose.

Mr. W. White, F.S.A., was satisfied that the chief element was the proportion of the building within the walls. In connexion with the building of many churches, he had carried out an invariable system, and he could claim only one failure, which was not on account of the proportions of the building, but from the intervention of a lantern in the centre. There seemed to be a general agreement that the proportion of the interior should be according to some harmonic ratio. This should not be a ratio of numerical or progressive proportion, but a ratio of absolute geometry. In that geometry the angles of 30, 60, and 120 were used in proportioning the distance from wall to wall, and from ceiling to floor. The proportions of 3, 4, and 5 had a definite relation to geometrical form, 3 and 4 being the two sides of the parallelogram, and 5 being the diagonal. Mr. White here exhibited several drawings, illustrative of his theory, one being of the Manchester Free Hall, the proportions of which were said to be 2, 3, and 5, that being an excellent room for sound. The proportions of the Massachusetts Hall were 3, 4, and 5, and the London University was very nearly the same, but not quite. The worst proportion for a room was a perfect cube. He remembered the case of one 25 ft. square and 25 ft. high, which was most intolerable for sound. The proportion mentioned by Dr. Brewer, viz., that a room should be two-thirds more than its breadth, was nearly the same as the proportions he had submitted. But he most of all wished to insist upon the fact of the actual coincidence of proportion of the equilateral triangle with the number of vibrations in a second forming certain notes of music in harmony with each other.

Professor Banister Fletcher thought it would be well if the subject were referred to the Science Committee with a view to the tabulation of information on that point.

Mr. Brydson wished to have some information as to the diagrams on the walls?

Mr. Langton Cole said he was the son of the architect of the Stock Exchange, the acoustic properties of which had always been a difficulty. To the three classes of buildings which Mr. Burrows had mentioned, a fourth should be added, namely, the building where a large number of persons all wanted to speak at the same time, and yet wished that there should be no noise. That meant that they wished to get rid of resonance, which was very mixed up with echo. If the Science Committee could help him to get rid of the echo in the Stock Exchange he would be ready to offer them every opportunity for experiment; of course, after business hours. He would like to ask Mr. Burrows whether he considered marble a resonant material or not? They had hung up flags round the piers of the dome, which answered well, but they were asked to take them down, because they gave the Stock Exchange the appearance of a charity bazaar.

Mr. Emerson (Hon. Sec.) thought if the last speaker would remove the alabaster and then remove the walls they would hear well on the Stock Exchange. The conclusion he had come to, from the study of domical buildings in India, was that those of which the walls came immediately under the dome square on plan, or with shallow recessed transepts, echoed more than any other buildings in the world. In buildings where the domes were supported on columns only, like some of the large domes in India, with a series of vistas from either side of considerable length, there was not nearly the same amount of echo. Domes were commonly stated to be bad for sound, and he believed it had arisen from the fact that they were almost always built over walls which nearly enclosed the space underneath, so that the sound could not get away. In Florence Cathedral there was not much echo, because there were large open spaces in proportion to the space covered by the dome, so that the sound got away.

The vote of thanks was then put, and was very cordially received.

Mr. Burrows said that, as a member of the Science Committee, he would be pleased if they could carry out Professor Roger Smith's suggestion, to collect as much information as they could of materials, construction, and ventilation, with the view of putting the results in a somewhat tangible form. As to the differences of material, they all went to show the enormous divergence of opinion which existed between observers. One said resonance was the right thing, and another said not, but as Mr. Statham had well put it, the main point was the consideration of the use to which the building would be put. The Stock Exchange had two *salarias*, one immediately under the dome, and

another in segments between each of the windows lighting the dome. There were also festooned draperies in the spandrels of the arches, and they had packed the floors with slag wool, yet all these things were unsuccessful. At the opening of the Stock Exchange, when an orchestra performed in it, the building was said to be exceedingly good for sound; but when it was used for speaking, the reflection of the sound came rapidly from the walls, and was bothering to everybody. If the marble was taken off, and wood used in its place, and if a ceiling was built up instead of the beautiful dome, it might possibly be a successful building. The convex cove, used at Langham place, was the reverse of the concave cove, and had been well illustrated in the *Builder*. Mr. White's contribution was an important one, confirming from his own practice the value of an approach to harmonic proportion. They should have some agreement, first, as to what they had to look for, and should divide the buildings into classes, studying the lines which should be applicable to each particular class.

The Chairman announced that the next meeting would take place on Monday, April 22, when the Art Committee had arranged for the reading of papers on "Marble," by Professor Aitchison and Mr. Wm. Young.

The proceedings then terminated.

COMPETITIONS.

PUBLIC LIBRARY, PERTH.—On the 19th inst., at a private meeting of the Perth Town Council, Mr. Washington Browne, architect, Edinburgh, gave his decision on the competitive plans lodged for the Sandeman Free Library. He placed plan No. 7 first, and bracketed two other plans, Nos. 1 and 5, equal second, the premium being divided. On the Town Clerk opening the sealed envelopes it was found that the winners were Messrs. Campbell Douglas & Morrison, architects, Glasgow, and that Messrs. Brown & Watt, Aberdeen, and Mr. A. C. Heiton, Perth, were bracketed equal second. On the motion of Bailie Young, seconded by the Lord Provost, the meeting awarded Mr. Washington Browne a hearty vote of thanks for his lucid and interesting statement, and for the care he had taken in advising the Council. The estimated expense of the building is 9,998*l.* without the picture gallery, and 1,470*l.* additional if it is erected.

PONTYPRIDD PUBLIC DRINKING FOUNTAIN.—The first premium in this competition has been awarded to Mr. C. B. Fowler, of Cardiff. There were close on thirty designs sent in. The fountain is to cost about 250*l.* The design is of a bold Early character, filled in with ancient British ornament, such as may be found at Llantwit, Margam, Llandough, and several places in the county. The structure stands 16 ft. high.

ARCHITECTURAL SOCIETIES.

YORK ARCHITECTURAL SOCIETY.—On the 21st inst. a lecture entitled "A Visit to Norway," was delivered by Mr. Norman R. Yeomans, in the Grand Saloon of the Corporation Art Gallery, under the auspices of the York Architectural Society. A number of the prize drawings of the Royal Institute of British Architects were on view in the saloon. Mr. Yeomans, by means of a large number of lantern views, conducted his audience through the various places of interest in Western Norway, from Stavanger to Trondhjem, the principal part of the journey being performed by steamer along the numerous fjords, and the land journeys by means of the curious conveyances of the country. The cathedrals of Stavanger and Trondhjem, together with the architecture of the towns visited, were fully described, and special reference was made to the old Stavekirke or wooden parish churches—those apparently semi-Asiatic buildings of which so many fine examples happily still exist.

CARPENTERS' HALL LECTURES.—The last Wednesday's lecture was given by Sir Leader Williams, on the Manchester Ship Canal, and will be reported in our next issue. The lecture for next Wednesday will be given by Mr. W. R. Lethaby (see our "Meetings" column), in place of Mr. H. H. Statham, who has been unable, on account of press of work, to prepare the lecture which he was announced to give on that evening.

STUDENT'S COLUMN.—Owing to pressure on our space, we are obliged to defer this week's chapter of "Bricks and Terra-cotta" to another issue.

Illustrations.

BUDAPEST OPERA HOUSE.

THE new National Opera House at Budapest takes a good place among the leading opera houses and theatres of the Continent, though the area covered by the block is by no means so extensive as might be expected in a country where national patriotism so often induces the people to blindly compete with larger and richer capitals.

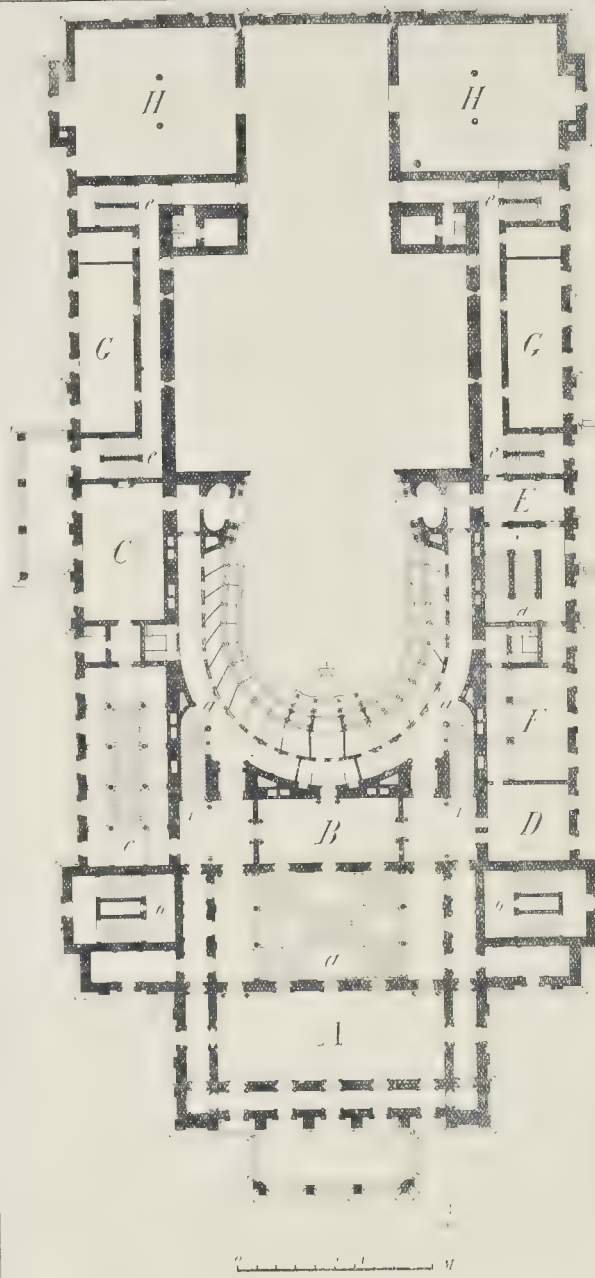
The National Opera House stands on a site facing the Grand Radial Avenue, which is second only to the Champs Elysées at Paris. Though the site has public thoroughfares on either side and at the back, these are, unfortunately, only about 60 ft. wide, and the effect of the building is by no means so good as it might have been on a more open site. The cramped position is said to be due to the financial difficulties which threatened to prevent the erection of the building in 1873, when the proposals were first made. At that time the Austrian Emperor, as King of Hungary, had notified his intention of presenting the nation with the structure, and the Municipality of Budapest made a gift of some 40,000*l.* for the necessary site. Though contributions from other sources were offered to cover the cost of a more suitable plot, they could not be accepted for various reasons, and this situation was finally determined on as the best available.

The history of the building commenced in 1873. Two years were spent in preliminaries, including a limited competition for the design, in which six architects took part. Each candidate received a fee of 200*l.*, and the winner was promised the commission besides a premium of about 1,500*l.* The late Freiherr von Ihyl was the successful architect, and the foundation-stone of the building was laid in 1875. But slow progress was at first made owing to a dearth of funds, and after the carcass was complete, there was some revision of the design in 1882, owing to the King Theatre fire. The building was eventually opened with much ceremony in September, 1884. It would be well to remember that the plans were prepared previous to the great theatre fires at Boston, Nice, and Vienna.

Though built as a national monument, and owned and administered by a Government Department, the Budapest Opera is managed on strictly commercial lines, so that the number of boxes reserved for Royalty and the Government and the number of official free seats is reduced to a minimum. The building is open to all comers on payment of admission. The King has his suite of reception-rooms, and some boxes at his disposal, and these he certainly makes use of; but the whole building is only reserved for his guests on very rare occasions, when the visit to the Opera would be a State function of great importance. The seating accommodation in the auditorium is too luxurious, and is comparatively small, and the heating, ventilation, and lighting is of the most expensive kind. In judging the plans it must be remembered that the building was designed as a national monument, with but little attention to economical working. No National or Court Opera House, planned as such, however economically managed, has hitherto been able to work without a subsidy; where the subsidy is to be avoided, the architect must know this at the outset and design accordingly.

One of our illustrations shows a plan of the Opera House at the level of the first tier and grand foyer. As will be seen, the grand staircase has a central position between foyer and auditorium, and the auditorium corridor is divided into "right" and "left" by the state box with its ante-room. The staircase always has to be passed to reach the foyer end. Owners of boxes on the "right" of the auditorium have a circuitous route through the foyer if they wish to visit owners of the box on the "left." On one side of the auditorium extensive accommodation is devoted to the reception-room and staircase to the King's private box; whilst on the other side the space has been given to the staircase and ante-room of the administration, and to an extensive practice-room. On either side of the grand staircase, staircases lead to the third tier, and these, it will be seen, have no connexion with the first tier. Separate entrances, vestibules, and lounges are provided for the third tier, which is arranged as a gallery, with rows of seats. The second tier, which really only consists of a few boxes, has two small connecting staircases from the first tier.

The floor of the grand foyer is about 9 metres above street-level. The grand staircase, which is



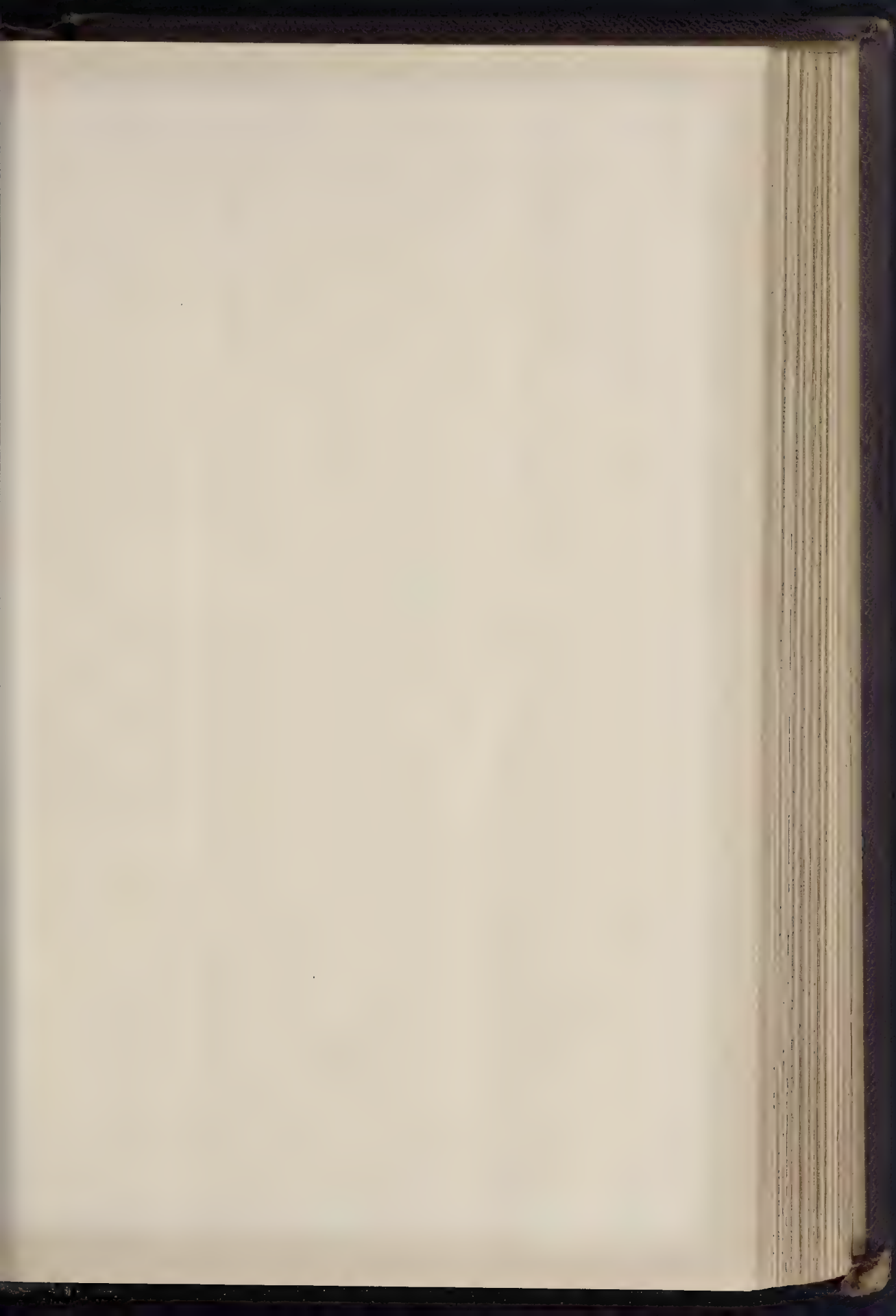
Plan of National Opera House, Budapest.

- | | |
|--------------------------------|----------------------------|
| A. Grand Foyer. | I. Alcove. |
| B. Ante-Room to Practice Room. | P. Practice Room. |
| C. Royal Reception Room. | G. Dressing Room. |
| D. Reception Room. | H. Stalls. |
| E. Grand Staircase. | Dressing Room Staircase. |
| F. Staircase to Third Tier. | Staircase to Second Tier. |
| G. Royal Staircase. | Staircase to Dress Circle. |
| H. Administration Staircase. | |

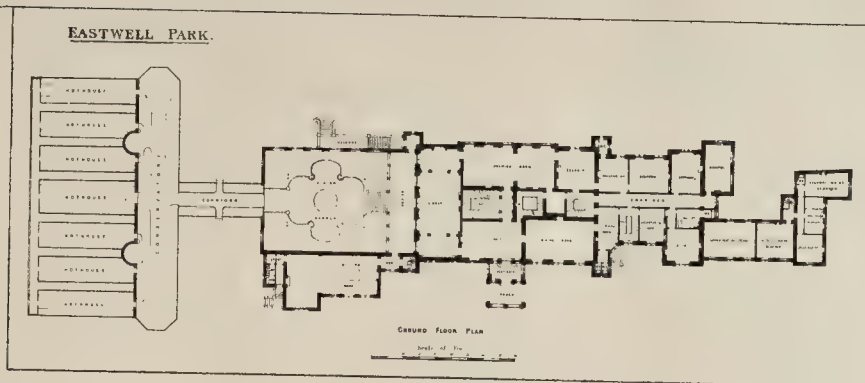
the main approach to this tier, has its own spacious vestibule raised a few steps above the pavement level. A *porte-cochère*, with three doors, affords ample protection for patrons arriving by carriage; there are two side doors for foot passengers, leading into the same vestibule.

Great care has again been taken to avoid all draughts by a good system of double doors, outer lobbies, or porches. The grand staircase is so

planned that the first flight leads to the level of the dress-circle, from which there are approaches to the stalls. The dress-circle is divided up into boxes. Extensive cloak-room accommodation has been provided for the stalls. The third tier staircases each have spacious vestibules adapted for forming "queue," with convenience from weather. The vestibules of the royal staircase, and the staircase of the

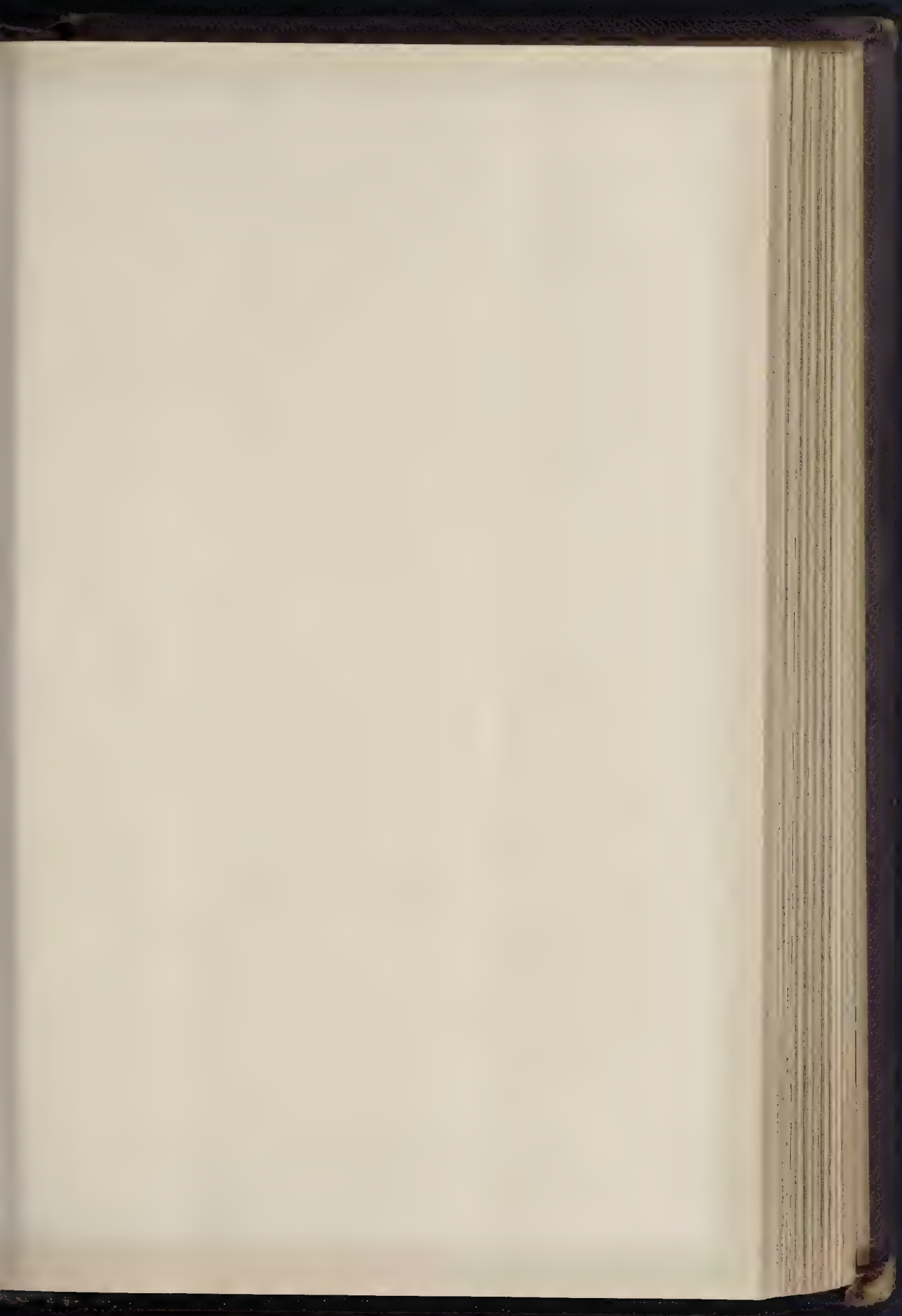






William Wallace

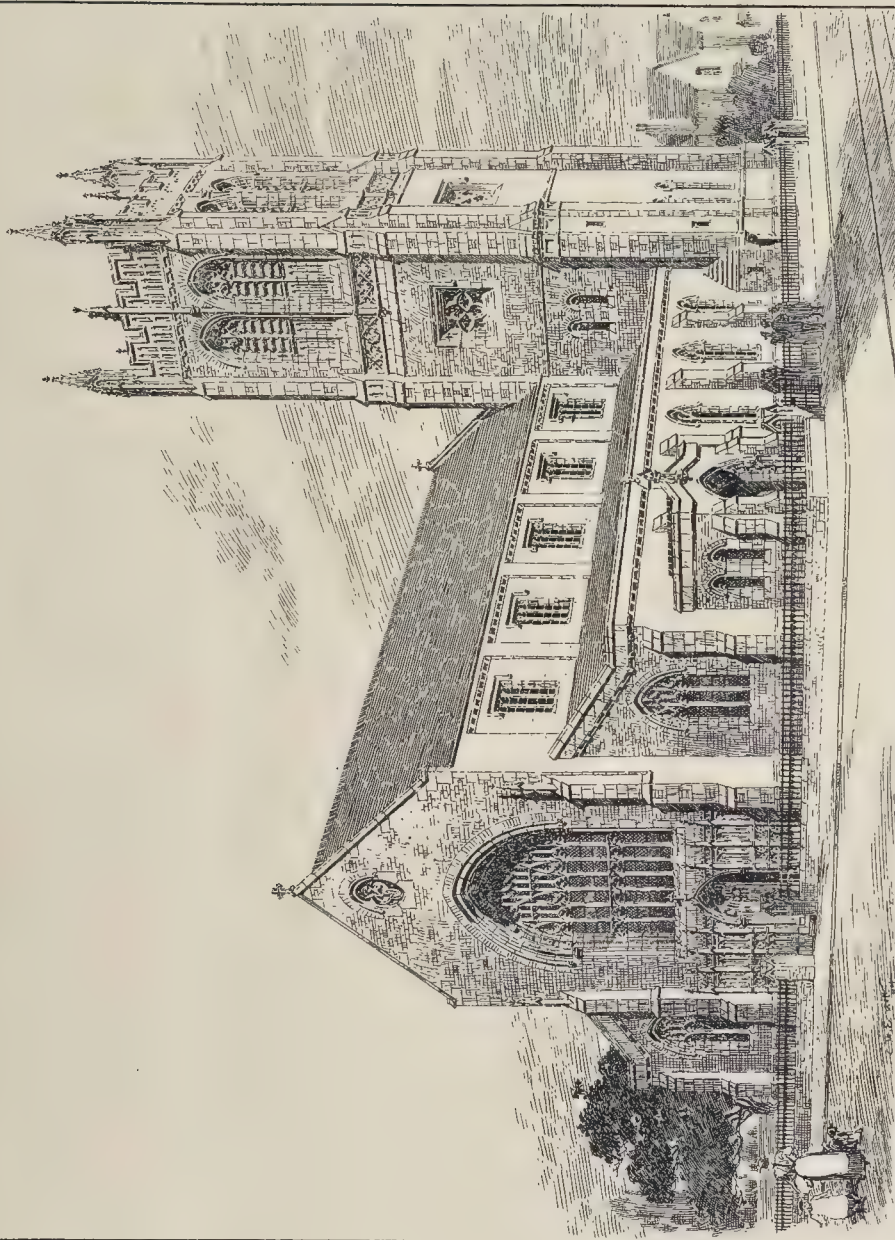
PHOTO LITHO SPRACUE & CO 483 EAST HARDING STREET FETTER LANE E.C.



THE BUILDER, MARCH 30, 1895



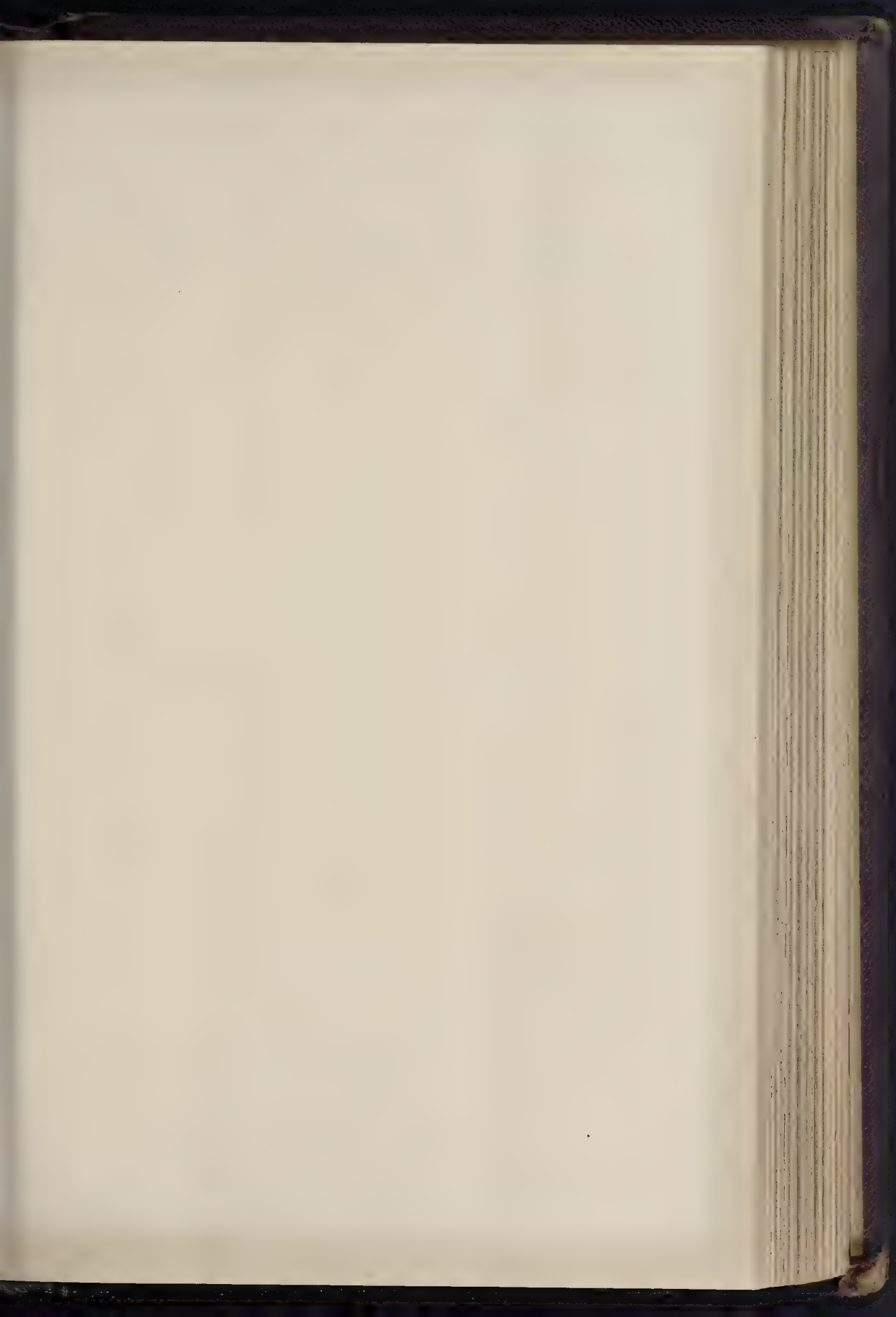
ST. JOHN'S CHURCH.
SASSENHWAITE LAKE.



CHURCH OF ST. TEILO, CARDIFF.

J. E. HALLIDAY,
ARCHITECT.

PHOTOGRAPH BY MR. C. H. B. EAST, HADONG STREET, LONDON. W.C.

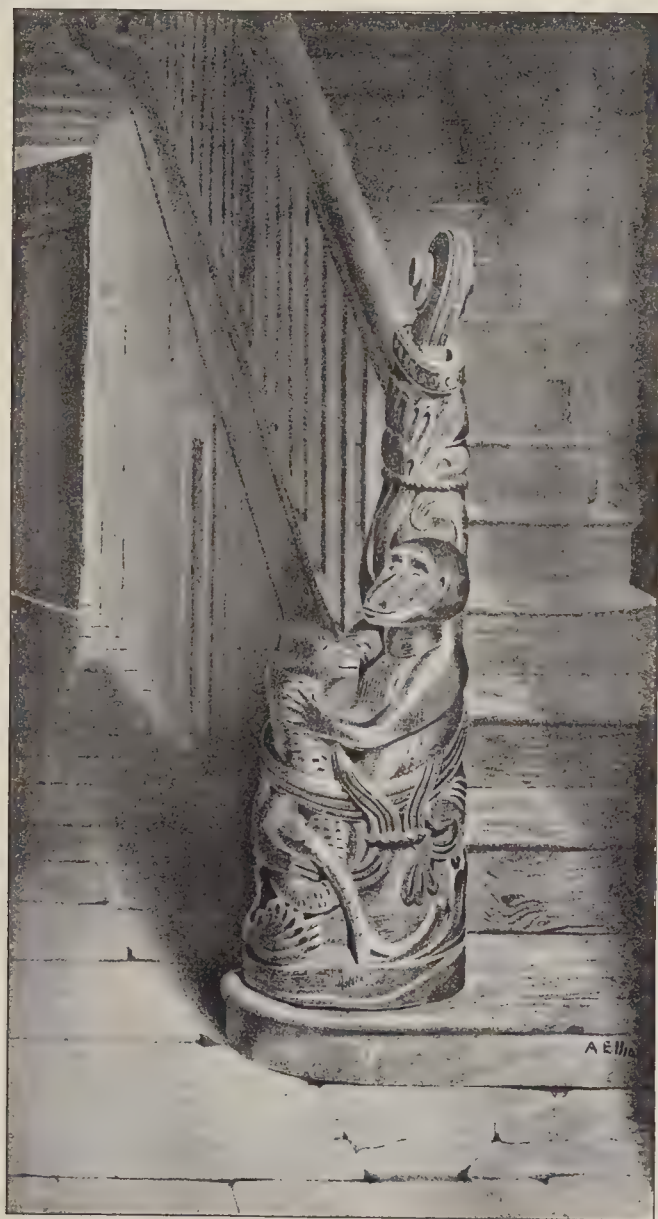




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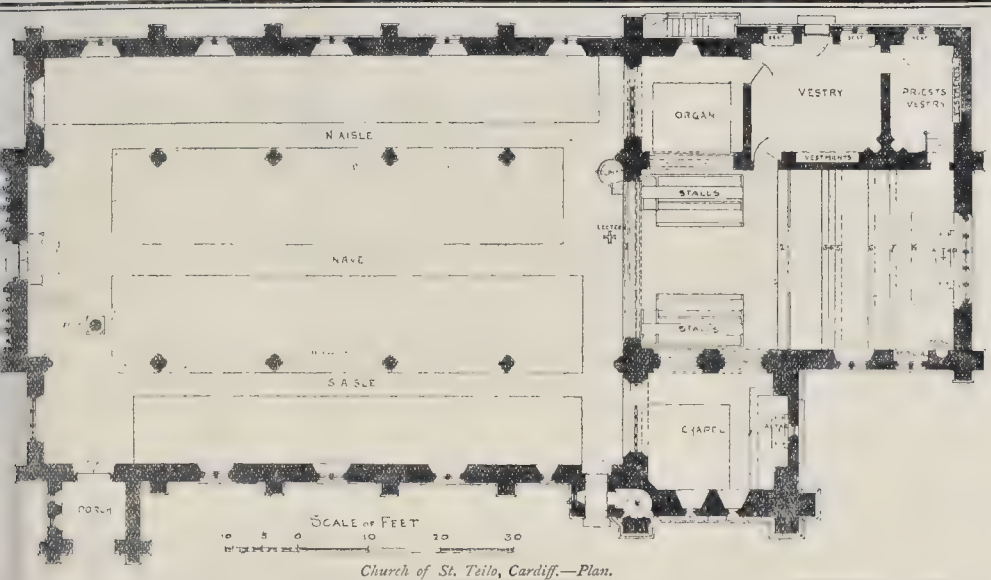


ANCIENT CARVED WOODEN



No. 3

ING. PHOTO SPRAGUE & V. & E. EAST HARDING STREET FETTER LANE E.C.



Church of St. Teilo, Cardiff.—Plan.

administration, are carefully planned, and have their own separate *portes-cochères*.

In the auditorium the division of seats is of some interest. There are only 428 seats in the floor of the house, and 477 in the third tier, and there altogether 65 boxes with 362 seats. This makes a total seating accommodation of 1,267, which is certainly very small, and can only be accounted for by the unusually luxurious dimensions of the seats and gangways. The building cost 3,200,000 florins, or over 250,000*l.*, so that the relation between the seating accommodation and the cost is interesting.

The great feature of the Budapest Opera House is its mechanical contrivances. The hydraulic stage (built according to the "Asphaleia" system), the warming, ventilating, and lighting of the building, have all had great attention given them, and lastly also the fire-extinguishing appliances, which include extensive systems of sprinklers. We cannot here enter into the technical details of the various elaborate appliances of which the building can boast, many of these are of an experimental nature, and are being constantly modified or altered. The "Asphaleia" stage has been found as perfect for practical working as promoters anticipated, nor has it been found economical. As the first example of its class, perfection could of course not be expected, but at the same time some serious mistakes were also made in its design. Of appliances which are certainly valuable we may mention the sprinklers over the stage, which are very well arranged. A trial of these appliances led it beyond doubt that, if the upper part of the stage was not overcrowded with canvas, no fire could live under their torrent of water for five minutes. To ensure their efficiency, however, the sprinklers must be kept in good order, the water supply must be always available, and the necessary officials who are to attend to the levers must be at their posts. A trial, however, conscientiously carried out, does not ensure the reliability of a sprinkler in case of need, nor prove the advisability of the great expenditure of money. Taking it for granted there are no mishaps or hindrances, the sprinkler can be of great service, if arranged as at Budapest, but the trial hydrants should on no account be omitted. Such mistakes must not be made as at Warsaw and elsewhere, where the great divisional curtains have been omitted on account of their introduction. The material employed in the façades is a local freestone. The interior by no means shows the over-decoration frequently found in continental playhouses. The general style is a somewhat severe Italian Renaissance, and the colouring rich but dark in tone. The woodwork is in a dark oak, and the drapery coverings in a dark red velvet. The staircase and reception-rooms of the King alone show a more brilliant system of decoration.

CASTWELL PARK, ASHFORD, KENT.
The extensive additions and alterations at Castwell Park for the Right Hon. Lord Gerard

were completed last autumn. The old mansion has been practically rebuilt, and a new wing added, with billiard-room, &c., on the ground floor, and bed-rooms over; also a large winter garden, conservatory, and plant-houses, entirely new stabling for forty horses, horticultural buildings, lodges, new water and drainage systems, electric light installation, formation of new gardens, lawns, lake, &c.

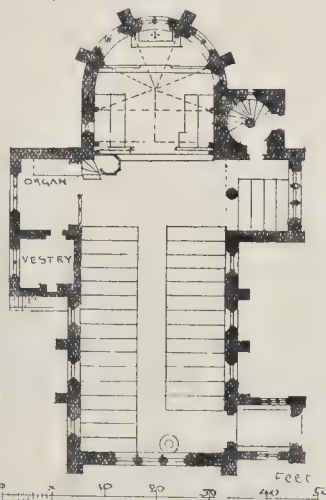
The architect was Mr. William Wallace, of London, and the principal contractors were Messrs. Holland & Hannen for the general building operations; Messrs. Gillow for painting, &c.; Messrs. Mackenzie & Moncur for conservatories and horticultural buildings; Messrs. Smith & Co. for iron roof of winter garden; Messrs. Stuart & Co. for granolithic paving, &c.; Messrs. Kavanagh for earth work.

The view shows the north front of the house. The drawing was exhibited at the Royal Academy last year.

ST. JOHN'S CHURCH, BASSENTHWAITE LAKE.

This church was built a few years since, mainly at the expense of Mr. John Boustead, late of Armathwaite Hall, near Cockermouth.

It is picturesquely situated under the wing of



St. John's Church, Bassenthwaite.—Plan.

Mount Skiddaw, an outlying spur of which is shown in the accompanying view.

The building externally is faced with Faugh's

Brown light grey limestone from Caldbeck Hills, the dressings are of light-coloured freestone from Howrigg quarries. Internally, the walls are finished with broad tooled Shaulk freestone; dressings tooled of similar stone, the reredos round chancel and apse being of a red quality of Shaulk stone, there being no plaster work in the church.

The internal woodwork is in oak, the nave roof being a "wagon-head," and the chancel vaulted and groined in oak.

The slating is of Green Buttermere (Cumberland).

The sitting accommodation is for about 220.

The architect is Mr. D. Brade, and the drawing was exhibited at the Royal Academy of last year.

CHURCH OF ST. TEILO, CARDIFF.

This church is intended to meet the requirements of the Cathays district of the large and thickly-populated parish of St. Andrew's.

The site on which the church is being erected was the gift of Mrs. Mackintosh of Mackintosh, who has also largely contributed towards the building fund.

The walls are of stone, with box-ground Bath-stone dressings. The roof-timbers are of pitch-pine left free from stain or varnish. The church accommodates 812 adults. The contractors are Messrs. Shepton & Sons, of Cardiff, who are carrying out the work from the designs and under the superintendence of Mr. G. E. Halliday, Architect and Diocesan Surveyor for Llandaff.

ANCIENT CARVED NEWELS AT ARGELES, HAUTES PYRENEES.

ARGELES DE BIGORRE (for that is the full name of the place) is a charmingly-situated village on the line from Lourdes to Pierrefitte in the Lavedan Valley, in the Department of the Hautes Pyrenées, and about nine miles from Lourdes.

The carved newels, of which three are illustrated, are a feature in the place, an expression of local taste and talent. Those marked No. 1 and No. 3, in two different houses, are probably of the same date and by the same hand, from their general resemblance in design. In the house where No. 1 is found there was no other carving at all, either on the staircase or about the house, and this is very often the case, all the ornament being given to the newel; but in No. 3 the ornament was carried throughout the staircase, for there were carved panels half way up each flight of stairs and on the landings, and at the turn of the stairs; the position of one panel and the turning are just hinted at in the drawing. No. 2 is a much more ancient example, and was found in a cottage in the old part of the town; it is a very bold piece of work cut out of the solid oak, but unfortunately the top has been broken; the owner on seeing the

drawing was rather distressed that this defect had not been made good. Here, again, there was no other carving about the house, which seemed to be bare of ornament, with the exception of the doors, which, as is generally the case in this district, were well panelled.

BUILDERS' CLERKS' BENEVOLENT INSTITUTION.

THE Twenty-eighth General Meeting of the donors and subscribers took place at the office of the Institution, 21, New Bridge-street, E.C., on the 26th inst., Mr. Charles Wall, President, occupying the chair.

There were also present Messrs. T. Stirling, V.P., James Aynesley (Carter and Aynesley), Edwin Brooks (Treasurer), C. K. Turpin, H. W. Parker, F. S. Oldham, B. G. Thompson, J. A. Robson, and other gentlemen.

After the preliminary business, the Secretary, Mr. H. J. Wheatley, read the report, which stated that the income for the past year had amounted to 308*l.*, the total being made up of 227*l.* 6*s.* 6*d.* in annual subscriptions, 326*l.* 1*s.* in donations, 128*l.* 4*s.* 3*d.* in dividends, and 125*l.* moiety of legacy bequeathed to the Institution by the late Mr. Thomas Robinson. There was a further sum of 10*s.* 2*d.* interest on deposit, and a balance of 18*s.* 10*d.* from the dinner account. On the other side, 340*l.* had been paid in pensions, and 36*l.* 10*s.* in sundry grants for temporary relief. For some years past the elections had been by show of hands at general meetings, specially convened for the purpose, but last year two contested elections were held—Mrs. K. S. Hill, Mrs. M. Smith, and Mrs. S. A. Bennett having been the successful candidates for the pension and Thirza M. Smith and Kate C. Hill for the orphan benefits, the latter consisting of admission to the Orphan Working School by presentations owned by the Builders' Clerks' Benevolent Institution. The total number of pensioners on the books, including those above-named, was nineteen, and three children were in the school. The annual dinner was held at the Holborn Restaurant (Mr. Wm. Shepherd presiding) on April 17 last, the appeal made by him on the occasion resulting in the sum of 330*l.* being announced in aid of the funds. During the year a purchase of 450*l.* stock had been made, bringing up the total to 5,000*l.* The Committee expressed their thanks to Mr. W. Shepherd for his valuable services as President during the past year. Mr. Charles Wall had consented to accept office as President for the present year.

The Chairman, in moving the adoption of the report, said that, looking at the figures furnished to him, he noticed that their income had grown, and the amount expended had also grown, showing that much good had been done for clerks and their widows.

Mr. T. Stirling, in seconding, said he was an old associate of the charity. He quite agreed to the importance of business habits, and as an auditor he knew the work was well done. The Institution had been of much use, and he believed its use would continue.

The report was then unanimously adopted. Mr. Wm. Shepherd and the other retiring officers were thanked for their services. Mr. Stirling, in acknowledging the vote of thanks, observed that although Mr. Shepherd had retired from the Presidency, he had not retired, he felt sure, in the way of giving up the interest he had taken in the Institution already, which he hoped would be continued.

New officers were then elected, including Mr. Charles Wall, of Chelsea, as President, and Messrs. Joseph Randall, Wm. Shepherd, and Charles Ansell as arbitrators.

A vote of thanks was then presented to the President for his services in the chair, and the meeting closed.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of this Council was held on Tuesday, in the County Hall, Spring Gardens, Mr. Arthur Arnold, Chairman, presiding.

Jobbing Works Schedules.—The General Purposes Committee reported that the Works Committee had forwarded to them a schedule of net prices for hoarding and shoring works, which prices have been agreed to by the valuer, the architect, and the manager of works, and approved by the Works Committee. The prices are the same as those charged under the last contract entered into for similar work before such work was done by the Works Department.

There only remains now the schedule of prices in connexion with engineering works. This, they hoped, would be settled shortly. A recommendation approving of the course taken was agreed to.

Appointment of Sanitary Inspectors.—The Public Control Committee reported that the Local Government Board had sanctioned the appointment of Messrs. May, Hills, and Gathercole as sanitary inspectors in the City of London, at the salary of 200*l.* per annum each. One-half of the salaries of these officers is payable by the Council, in accordance with the provisions of the Public Health (London) Act, 1891.

Progress of the Blackwall Tunnel.—The Bridges Committee presented a report detailing the operations in connexion with the Blackwall Tunnel, in which it was stated that if the open approaches to the Tunnel be considered as finished out of a total of 6,200 ft., a length of 4,100 ft. was executed at the end of February. With regard to the cast-iron-lined part of the Tunnel, considered by itself, out of a total distance of 3,083 ft. a length of 1,410 ft. was completed. The estimated cost of the work done up to February 28 was 487,378*l.*, of which 9,724*l.* represented the value of work executed in connexion with the raised approach road, and 4,935*l.* was due to the progress made during February.

London Building Act, 1894, Part XI.—Low-lying Lands.—The Building Act Committee brought up the following report, the recommendations being agreed to:—

"On 5th June last, the Council, on the recommendation of the main management, made with the concurrence of the Tribunal of Appeal constituted under the General Powers Act, 1893, certain regulations with regard to building on low-lying land. Appeals in respect of this matter as well as of all others in relation to the construction of buildings and so forth, having, under the London Building Act, 1894, to come before the new Tribunal of Appeal appointed under that Act, it is necessary as a matter of form to make the regulations under the new Act. We accordingly recommend—

(a) 'That the Council do, under section 173 of the London Building Act, 1894, make, with the concurrence of the Tribunal of Appeal constituted under section 174 of the Act, the following regulations prescribing the course to be followed by applicants for permission to erect or adapt dwelling-houses on low-lying land—Every person who shall be desirous of erecting or adapting any building to be used wholly or in part as a dwelling-house on any land in the county of London which the surface is below the level of Trinity high water mark and which is situated in a district in which the Council has power by gravitation into an existing sewer of the Council, shall first make a written application for a licence. Such application shall be addressed to the clerk of the Council. Such application shall contain a statement as to the nature and extent of the interest of the applicant in the building or buildings proposed to be erected or adapted, and be accompanied by a plan and section of the lowest floor of such building or buildings, and the curtilages thereof, to a scale of 3/4 of an inch to a foot, and by a block plan to a scale of not less than 1/4 inch (which may be on a sheet of Ordnance Survey, or may be drawn on tracing linen) showing the position of such building or buildings and the local sewer into which it is proposed to drain such building or buildings, and the connexion of such local sewer with an existing sewer of the Council. Such plans and sections shall be accompanied by a description of the materials to be used in the construction of such building or buildings, and shall be coloured in accordance therewith. The points of the compass shall be marked on the block plan. The position and course of the drainage system proposed to be adopted for the disposal of sewage and rain water, and its connexion with the local sewer or an existing sewer of the Council, shall be clearly shown on the plans and sections, and the diameter and inclination of the drain pipes shall be figured thereon. The plan and section shall also indicate in figures the level above or below ordnance datum at which it is proposed to construct the floor of the lowest rooms. The decision given by the Chief Engineer of the Council upon such application shall be reported to the Building Act Committee, and the Committee shall report it to the Council, and thereupon, if it is to the effect that the erection or adaptation may not be permitted, the Clerk of the Council shall by letter inform the applicant that the Council, acting upon the decision of the Engineer, has refused permission. If it is to the effect that the erection or adaptation may be permitted, a licence under the seal of the Council embodying the conditions of the Engineer's decision shall be issued to the applicant.

(b) 'That the Council do, under the following regulation under Section 172 of the Act—It shall not be lawful to place the under side of the lowest floor of any permitted building at such a level as will render it liable to flooding, and every permitted building shall be efficiently and properly drained, to the satisfaction of the Engineer for the time being of the Council, either into a local sewer or into a main sewer of the Council.'

London Improvements and "Bellevue."—Mr. Westacott moved, and Sir J. Blundell Mapie seconded the following resolution:—

"That the question of the removal of the obstructive buildings in front of Bozies'-court, at the corner of Tottenham-court-road and Oxford-street, which cause a great interference with the traffic, be referred to the Improvements Committee, and that they be instructed to report to the Council as to the

advisableness of such improvement being undertaken, and carried out by the Council."

Mr. Beachcroft said that to show that the Moderate party were prepared to take a reasonable view on the "betterment" question, he would mention that in his opinion about a third of the cost of that particular improvement could be and should be recovered by such a charge.

Mr. Whitmore, though he hoped the new Council would not adopt the old Council's policy of hanging up all improvements until it secured the particular form of "betterment" approved by the majority, nevertheless opposed the motion, because he was not in favour of dealing with the question of improvements in such a piecemeal fashion.

At seven o'clock the debate stood adjourned, and the Council then rose.

Correspondence.

To the Editor of THE BUILDER.

CARDIFF, SOUTH WALES, AND MONMOUTHSHIRE ARCHITECTS' SOCIETY.

SIR,—Your version of this matter, as "very unprofessional and very discreditable" in respect to some members of this Society, is perfectly fair and well justified.

If Mr. E. M. B. Vaughan, its President, were better advised, he would long ago have given over the futile and "thankless task" of white-washing, in order to engage in some efficient withdrawal from the impossible position into which the Society has been rushed. This would be a "vindication" of the right kind, doing justice to a number of estimable local architects who view with much concern a Society drifting into grave difficulties through the conduct of a minority which has, by a class of energy fortunately infrequent in professional affairs, obtained the true mastery of the ship.

In writing to you, Mr. Vaughan takes upon himself to speak for the Cardiff Corporation and their obligations, legal or otherwise, towards me. I therefore state that there is absolutely no basis for anything him to thus prejudice the matter, and he already knows enough of the facts to have prevented his doing that.

I want the upshot of this case to be a help towards defining what an allied society of the Royal Institute of British Architects may, or may not, creditably be made to do by organised interference with the well-recognised practice of a member: and what class of influences they may call into play upon that sometimes variable quantity known as "the mind" of public bodies.

Mr. Vaughan was some time ago urged in very emphatic terms to place his view of the case before the Institute, and well-known architects have written to me with a similar suggestion. If his cause is good, why does he hesitate? As ex-President he certainly have not had any hesitation thereon.

Such a clear A B C of professional right and courtesy could soon be pronounced on at headquarters, and the best evidence of necessity for such pronouncement is this:—that on my making at length an unmistakable stand against a series of unprofessional acts, Mr. Vaughan does not recognise therein anything of better calibre than "bad judgment and ill-feeling in forcing this matter before the public notice." This quoted sentence has a queer ring about it, in face of the fact that the first notification of any proposal of the Society to memorialise for my work appeared in the press even before my meeting, and that immediately after the memorial was drawn up, its text was again prominently published with my own name specially introduced in a manner which has seriously prejudiced me. Then again, Mr. Vaughan's professional discernment limits him to seeing "nothing whatever which can be construed as dishonourable or reflecting discredit upon the Society," in the chief phrase of that remarkable memorial to the Museum Committee, viz.:—"That unless they have already pledged themselves to any architect, they should invite, &c." Considering that I won the building (which included the Cardiff Museum and Art Gallery) in well-contested competition in 1880: that I was commissioned and did prepare plans, details, specifications, and quantities, and obtain tenders for extensions thereto in 1889; that those extension-plans were after two years abandoned partly because I myself helped to show good reasons therefor: that without intermission since 1880, I alone have acted continuously as architect for the Museum and Art Gallery; that these facts were

perfectly well known to these local architects: considering all these things, with very many others of which I cannot ask for space here, then the architects' very *naïve* suggestion to the Committee respecting "pledging" seems to contain something more forcible than the harmlessness of the dove. For it does two things; it first betrays their knowledge respecting another architect, and it next opens the minds of the Museum Committee to the high importance of "pledging," in case they are *only* honourably bound and not pledged to me. Truly, "there be amendings which do magnify the first-done fault."

As I have shown, this matter was "forced" before the public by the Society, or more probably by one of its energetic votaries, for even the action. Secretary (as he courteously wrote me) did not know of the "memorial" meeting having been summoned, and would have objected had he known it! Then, again, an important reason why this extraordinary memorial was sent to the Museum Committee was publicly stated by the President to be that the agent of the landowner, from whom the new museum site was purchased, was present (as an architect-member of the Society) at the said meeting, and that he told the other architects that one of the conditions of the taking called for a competition. This statement, when questioned by myself (for I had been acting officially in respect to the agreement), was afterwards contradicted, and the gentleman said to have made it also wrote to me to say he did not make it.

And, with such contradiction, down went the one shaky prop which had been exhibited as a sufficient justification for the Society's conduct! Immediately thereupon, the "efficient withdrawal from an impossible position" should have been taken in hand, and I should then not have needed to trouble you with this letter. But no; the Memorial still remains as a threat to me, undisturbed by any single action of mine towards either the Architects' Society or the Museum during the years I have been concerned with both. Nor have I taken any precipitate action. This instance of public interference is by no means the only one I have suffered from recently, though it is the first time it has been organised; but, being then first President of the Society, and desirous of avoiding contention, I took no defined action.

When the present case arose (five days after my vacating the presidential chair), certain attendant circumstances disclosed to me what was on hand (together with the various agencies relied on for success), and I wrote at once to the president that I had legal claims on the museum as architect, which would be upheld, and declining to enter into discussion with anyone but my clients upon a business matter which was in my hands. I also wrote to the Secretary, before the meeting, courteously protesting against interference, but that letter was not read to the members. Then, when in spite of all I had urged, the memorial was rushed through, a large number of names was attached to it of members not present, or knowing nothing of its contents, certain of whom afterwards strongly objected to the memorial altogether.

This peculiar method being disclosed when the document was duly presented (but deferred), I expected during three weeks after to see some reforming step taken. It did not come, and I at length wrote to the President expressing regrets at being unable to attend the annual dinner, making that opportunity of letting him know, with some candour, my opinion of the members' treatment of me.

I did not expect him to announce or even touch upon that latter portion at the dinner, but afterwards found myself, as ex-President, ignored decisively, and my letter again suppressed, though other letters of apology were referred to in the usual way. Such an incident of only roused public interest, after the previous public announcements by the Society of its doings respecting me and my work, but it went far to declare that the local Society is not the body for me to appeal to further.

Your own editorial comments were a fair and best reflection of these circumstances, and though Mr. Vaughan's letter to you has made this fuller statement requisite, I shall avoid further debate unless my complaint of bad treatment is either admitted, or shown to be groundless by an acceptable authority quite other than the Cardiff Society or a "memorialist" member of the same.

EDWIN SEWARD.

Cardiff, March 25, 1895.

WAVERLEY STATION HOTEL COMPETITION.

SIR,—I observe that you have published a letter

from Dr. Rowand Anderson with reference to the Waverley Station Hotel Competition, and have also commented thereon in your issue of March 23. I think it would be only fair to the Railway Company that you should publish the Secretary's reply to the above letter, and which apparently Dr. Anderson has withheld when sending you the letter.

You will be good enough to contradict the statement that I am the engineer to the Railway Company, which is entirely untrue.

I shall be pleased by your publishing the selected designs, and also those of Dr. Rowand Anderson, so that the profession and the public may be able to form their own judgments.

W. HAMILTON BEATTIE.

Edinburgh, March 25, 1895.

** The intimation that Mr. Beattie was engineer to the North British Railway Company was made under a misapprehension on our part. It is however admitted that he has acted a good deal professionally for the Railway Company. The Secretary's letter in answer to Dr. Rowand Anderson we have seen a copy of, but it contains merely the usual assertions in such cases—that the directors chose what they considered the best design, &c. We are not throwing any blame on Mr. Beattie; but the whole story leaves the impression that he was intended to have the work all along, and that the competition was a foregone conclusion. It is manifestly impossible that the real merits of six elaborate sets of drawings for so large a building could have been gone into at one sitting. —ED.

CONFERENCE ON TECHNICAL TRAINING.

SIR,—My attention has been directed to the report in your issue of the 16th inst., of the Conference on Technical Training of Workmen in the London Building Trades.

In the said report I am made to state that my Society had approached the "Central Association of Master Plasterers," whereas what I did state was that our society had approached the Central Association of Master Builders.

You will greatly oblige by correcting this mistake, as there is no such body as the Central Association of Master Plasterers.

GEORGE COLE.

Dis. Secretary, N.A.O.P.
** There appears to be something very like it, however, from the following letter.—Ed.

THE PLASTERING TRADE.

SIR,—As Secretary to the Master Plasterers' Association of London, may I be permitted to reply, through your columns, to the remarks made by Mr. G. Cole, of the National Association of Operative Plasterers, at the meeting convened by the Architectural Association to consider the question of the technical training of workmen in the building trades.

While acknowledging the total failure of the Unions to induce their members to attend the technical classes opened at Great Titchfield-street, although every effort has been made by the promoters to render them attractive (even to the extent of providing the necessary tools for students), he went on to state that the men who at present carried out the bulk of the plastering work of London "had no regard whatever as to how the work was done," and "had no standing in his trade."

This I beg to flatly contradict. Either Mr. Cole had no knowledge of what he was discussing or wilfully perverted the facts. The master plasterers of London, as a body, are second to none in the building trade in their desire to improve the practice of the craft, and indeed it is solely owing to them that plastering still maintains its position in the list of trades.

It is they alone who have accepted and taught such apprentices as have of late years entered the trade through that (the sole legitimate) channel. I should say that it would be almost impossible to find a youth who had been apprenticed as a plasterer to a builder, or who, having been so apprenticed, had obtained anything like an adequate knowledge of his trade. The principal objection among builders to taking apprentices to any particular branch is simply that they cannot themselves adequately supervise the instruction of a youth, but must necessarily turn him over to a foreman or manager, who, having no personal interest in teaching him, simply looks upon him as a nuisance, or just allows him to go his own way, and pick up his trade as best he may, while the men among whom he works are, as a rule, by no means eager to help him, lest, in the fulness of time, he may displace themselves. Moreover, the builders have no certainty of regular employment for apprenticed plasterers.

With the master plasterer the case is different.

In the first place he is a specialist, and necessarily himself a practical man. He must give a close, personal supervision to his work, and is in immediate and constant touch with his men. He deals, as a rule, with every phase of his trade, both in the shop and in the building; has an intimate knowledge of the material in which he works, and must be able to correctly read drawings and measure work, and, above all things, must have a full and

sufficient knowledge of the value of work—a matter of which the average mechanic has but the remotest idea.

If it were not invidious to mention names I could immediately call to mind a score of men of standing and substance in London, who fully answer to this description, who have or might take apprentices to the advantage of the youth, themselves, and the trade generally, who would have every opportunity of making themselves masters of their craft.

But against this the Plasterers' Union have been doing their best by, in the first place, endeavouring to drive out the master-craftsmen altogether, and in the second, by endeavouring, as far as their power extends, to resist the entrance of lads into the trade, by making rules to enforce the payment of full wages to young men who could in no sense be regarded as competent mechanics, although, perhaps, of full age.

They have, it is true, a role as to improvers, but in practice will not allow a young man to work with their members unless he is paid the standard rate. Their inconsistency is shown by the fact that while they boycott the Master Plasterers who supply both labour and material, they allow their own members to take task work, labour only, a fruitful source of scamping and sweating—these men being wholly dependent for their profit on cheating the builders, or grinding the faces of their men, their prices being invariably below those of the employer, who has business premises to maintain and a staff of clerks and foremen to pay.

I am old-fashioned enough to believe that the demand will create the supply, and that quite provincial firms will continue, so far as their opportunities allow, to educate young men in the trade, who, attracted by the higher rate of wages, will drift up to London and fill the places rendered vacant by the purblind action of union officials, whose first and last care is to maintain their hold on their members, and whose anxiety for the welfare of the trade as a whole may in the majority of cases be judged of by their action in this particular case.

March 20, 1895.

SAMUEL WRIGHT.

THE PURIFICATION OF SEWAGE BY MICRO-ORGANISMS.

SIR,—In your note upon my system of sewage purification by micro-organisms there is a suggestion that a "cultivation" filter-bed "may prove favourable to the development of some pathogenic organisms," and in answer to the question, Does the system ensure the destruction of all pathogenic bacilli? you say that upon this point the evidence is far from clear, and that Dr. Sims Woodhead's statement is very guarded. I trust you will kindly afford me an opportunity of pointing out that there is a great difference between a "cultivation" tank being favourable to the development of pathogenic germs, and its being capable in every case of "ensuring" the destruction of all pathogenic bacilli. If Dr. Sims Woodhead had the slightest fear that the "cultivation" tanks would develop pathogenic bacilli, I am quite certain he would never have "spoken favourably" of the system, but his good opinion of it is quite consistent with his being guarded as to the certainty of its "ensuring" the destruction of all pathogenic bacilli, which is a very different matter. There is room, in our present state of knowledge, for doubting whether or not certain pathogenic organisms could run the gauntlet of vast armies of harder and harmless forms under the conditions supplied in a "cultivation" tank, but the fact that the typhoid bacillus dies out rapidly in an ordinary sewer where it meets similar enemies makes it exceedingly unlikely that they could escape.

Providing conditions most unfavourable to the survival of pathogenic forms is surely a step in the right direction.

Of course, the whole subject is at present open to argument. If certain of the organisms which are most active and beneficial in their work of breaking down effete organic matter are injected into the circulation of mice and guinea-pigs, they produce more or less specific trouble according to the dose, but even if the sewage were sterilised, I would be very sorry to have it injected into my circulation. Ordinary garden soil would provide material for an equally dangerous experiment.

The fact remains that Nature does carry on her work of purification by organisms that are for all practical purposes harmless, and the "cultivation" of these organisms provides conditions which are most unfavourable to the development of pathogenic forms.

I am somewhat vexed that you should have referred to the success of the installation at Toweston, because by an extraordinary coincidence it ceased to be perfect from the moment I asked to be paid for it. I would rather you had mentioned the much larger installation now successfully working at Boulogne.

W. D. SCOTT-MONCRIEFF.

SEWAGE PRECIPITATION.

SIR,—In response to Mr. Tarte's inquiry, published in last Saturday's *Builder*, I beg to say that when in Derbyshire last spring I found that several of the townships had adopted the Ives' system—I believe that is the correct name—for purifying town sewage by means of precipitation, I heard it spoken

of in the very highest terms by some of the Borough Engineers, and I may mention that I know it has proved singularly successful in Tamworth, Ilkerton, and Alfreton.

If Mr. Tarte were to write to the Borough Engineers of those towns, I have no doubt they would satisfy him of the accuracy of my statement.

JOHN EDWARDS.

LECTURES FOR "OLDER PRACTITIONERS."

SIR,—The Note in your issue of March 16, on the arrangements made in Berlin for lectures on technical subjects to "Older Practitioners," is well worthy of the attention of those of us who began life a little too soon to have the advantages of the scientific instruction which is now so lavishly offered on all sides—and at our expense—to our juniors.

It would be greatly to the advantage of men who "carry on their work on the lines of twenty or thirty years ago," but who yet are not too old to learn, to have opportunities of bringing their knowledge up to the standard which obtains in the present day, and of studying the much more developed and accurate methods of dealing with problems of design and construction, which scientific enquiry and research have made available.

The *savoir faire* of the organisers of the Berlin lectures for older men, in keeping their lectures out of the way of the schoolboy type of student, may be commended to the notice of the authorities of our University Colleges in London and elsewhere.

"AN OLD PRACTITIONER."

OBITUARY.

MR. F. G. WIDNELL.—We regret to hear of the death of Mr. Frederick Grainger Widnell, the well-known building surveyor, senior partner in the late firm of Widnell & Trollope, of Pall-mall-street, Westminster. Mr. Widnell, who received his professional training in the office of Mr. W. J. Gardiner, held for many years the appointment of Surveyor to the Admiralty. He was engaged in the preparation of quantities for some of the largest buildings in London, and in connexion with the fortification works erected under Lord Palmerston's Defence Act.

Mr. Widnell's loss will be deplored by his many professional brethren, and by others who appreciated his high character, and were accustomed to resort to him for advice. Mr. Widnell was for more than twenty years a Fellow of the Surveyors' Institution, and was associated on several occasions with one of its most important executive committees. Mr. Widnell's funeral took place on Monday last at East Sheen, where he formerly resided, and where some of his family are buried.

MR. CHARLES R. GRIBBLE.—We regret to record the death of Mr. Charles Risdon Gribble, at his residence, 37, Montague-place, Russell-square, W.C., on Tuesday last. Mr. Gribble had for some years past, and up to the time of his decease, held the appointment of architect to the National Provincial Bank of England, Limited, during which period he carried out several important alterations at their head office, and at the Birmingham, Bristol, and Cardiff branches. Mr. Gribble also erected for their new banks in Newport, Monmouth, Haverhill, York, Landport, Boston, Barry Dock, Warrington, West Hartlepool, &c., and also several sub-branches for the Birmingham and Bristol branches. The extensive works in alterations forming the London Agency of the Deutsche Bank, and the new branch of Messrs. Lambton's bank at Sunderland, were also carried out by Mr. Gribble.

MR. ERNEST TURNER.—Mr. Ernest Turner, F.R.I.B.A., whose death we referred to last week, was Chairman of Council of the Sanitary Institute, and an Associé Etranger Société Française d'Hygiène. He was the third son of the late William Hall Turner, F.R.C.S., L.S.A., and was born in 1834, being educated at King's College School, London. He was afterwards articled to his cousin, the late Arthur Newman, architect, of Southwark, and was subsequently for some years assistant to Mr. Bulwer, architect and County Surveyor, Maidstone, and afterwards commenced practice in London. He early turned his attention to practical sanitation and hygienic construction, and at the time of his death was one of the leading sanitarians of the day. He was for twenty years a member of the council of the Sanitary Institute, and was almost from the foundation one of the judges of the exhibitions held in connexion with the annual congresses of the same body, as well as an examiner in sanitary science, and at the Royal Institute of British Architects. He designed and carried out the Rotherhithe Sick Asylum, Hospital at Teheran, Persia, and the Central London Throat and Ear Hospital. He was also consulting architect to the Hospital for Epilepsy and Paralysis, and Devon and Exeter Hospital proposed extensions. Mr. Turner also designed and carried out the three large hospitals at Battersea, Kilburn, and Penge. He also redrafted many houses and institutions in London as well as country mansions. Among his architectural works may be mentioned Christ Church Schools, Gipsy Hill; Parochial Schools, Herne Bay; house at Palace Court; Wimpole-street; Gipsy Hill; country houses at Totland Bay, Ascot, Sevenoaks, &c. The

deceased was secretary to the Section "Architecture in relation to Hygiene" of the International Congress of Hygiene and Demography, and the success of this section was largely due to his labours. Mr. Turner contributed many papers at various times on sanitary matters, and he also wrote a work entitled "Hints to Housebuilders and Householdiers." His opinion was always greatly valued, as he possessed considerable business qualifications and much common-sense. He had a very large circle of friends, by whom his unexpected death will have been a great regret.

GENERAL BUILDING NEWS.

PROPOSED REMODELLING OF THE BRIGHTON TOWN HALL.—Definite proposals were made to the Brighton Town Council on the 21st inst. relative to a scheme that has intermittently engaged their attention for the past twelve years, namely:—(1) The construction on the site of the present Market and Corporation property adjoining new Police Courts and Offices, accommodation for the Police Fire Brigade, and a Fruit and Flower Market; and (2) the alteration of the Town Hall, including the rearrangement of all the Offices, the enlargement of the Council Chamber, and the provision of suitable Committee-rooms, ante-rooms, and other conveniences. Detailed contract drawings and specifications have been prepared, the estimated cost being as follows:—Retail Fruit and Flower Market, 6,500l.; New Police Courts and Offices, 24,000l.; Fire Brigade Station, 2,500l.; alterations to Town Hall, 20,000l. The recommendations made by the General Purposes Committee were that the Works Committee should at once advertise for tenders for the erection of the new Fruit and Flower Market only, and for the erection of the Police Courts and Offices and the Fire Brigade Station at such dates as they may deem advisable, having regard to the necessity of first completing the Market. They also recommended that the contract drawings and specifications for the alteration of the Town Hall should be approved, and that the Works Committee should advertise for tenders for the performance of the work at such times as they may consider will be most convenient. An amendment to refer the question back to the Committee was carried by 21 votes to 30.

WESLEYAN SCHOOLS, LEEDS.—The foundations of a new Sunday-school in connexion with the Richmond Hill Wesleyan Chapel, Leeds, were laid on the 23rd inst. Mr. G. F. Danby, of Leeds, is the architect of the new building. The premises will consist of a central hall or assembly-room, 63 ft. by 25 ft., capable of seating 450 persons, with a recessed platform at one end. It will be lighted by two large mullioned windows at the front, and dormer windows at the sides. Over the platform will be an ornamental circular window, filled in with tinted leaded lights. The room will have an open timber roof, 24 ft. high in the centre. Separate entrances for the boys and girls will be provided with tiled lobbies and glazed screens. Abutting on both sides of the assembly-room will be class-rooms. There will also be a ladies' sewing-room or church parlour, 30 ft. by 21 ft., with lavatory, &c. In the basement will be an infants' class-room, 30 ft. by 21 ft., with raised gallery at one end, and another class-room, 34 ft. by 21 ft. The roof of the internal woodwork is to be of pitch-pine varnished. The cost of the building, including boundary-walls, will be 2,800l. The works are to be carried out by Mr. C. Myers (brick and stone work), Mr. T. Harrod (wood work), Mr. T. Barrard (plumbing), Mr. Pennington (plastering), Messrs. Pickles Brothers (slating), and Messrs. Holmes & Co. (heating).

PRESBYTERIAN CHURCH, HAMILTON, LANARKSHIRE.—On the 23rd inst., the memorial stone was laid of Avon-street United Presbyterian Church, Hamilton. The new structure is to replace the present church, which was erected in 1779. The church has been erected from plans by Mr. J. B. Wilson, architect, Glasgow. The contractors are:—Mason, R. Downie, Hamilton; Wright, J. C. Burns & Co., Larkhall; slater and plasterer, James Currie, Hamilton; plumber, W. P. Mitchell; painter, S. Kemp, jun., Hamilton; glaziers, McCulloch & Co.; wrought iron, McCulloch & Hope, Glasgow; heating, Boyd & Sons, Paisley.

THORNLEIGH PUBLIC SCHOOL, NEAR GLASGOW.—The Eastwood School Board having resolved to rebuild the school which was destroyed by fire last month, instructed Mr. William G. Rowan, architect, Glasgow, to prepare a plan. Mr. Rowan has just submitted his plan, and it has been approved by the Board.

CATHOLIC CHURCH, FELLING-ON-TYNE.—There has just been opened by the Bishop of Liverpool, in the absence of the Bishop of Hexham and Newcastle, a new Catholic church at Felling-on-Tyne. The church, inclusive of galleries in west end and transepts, seats 1,000, and being on an inclined site, has a basement story under one half of it built of Windy Nook stone. The electric light fittings, dynamo, accumulators, and gas-engine are by R. Barnett & Co., Newcastle. The high altar and reredos, in Caen stone, is by Mr. Milburn, sculptor, York; the altar and transept rails, of Caen stone and marble, by Pyle, of Newcastle; paving to aisles, sanctuary, &c., of marble terrazzo, by Ebner, of London; heating apparatus, by Metcalf, of Preston, Lancs; three stained-glass windows in sanctuary apse, by

Atkinson Bros., of Newcastle. All the remaining work, inclusive of wood-block flooring, lead-glazing, &c., was by Mr. Joseph Howe, of West Hartlepool, contractor. The architect was Mr. C. Walker, of Newcastle.

SANITARY AND ENGINEERING NEWS.

SEWAGE PURIFICATION SCHEME, EIGHTH BANKS, DURHAM.—The Chester-le-Street Rural District Council have decided to consult Mr. Balfour, M.Inst.C.E., of Newcastle-on-Tyne, to a scheme of sewage purification for Eighth Banks in their Union.

PIER, MORECAMBE, LANCs.—The contract for the construction of a pier at Morecambe has been let to the Widnes Foundry Company, Lancashire. The engineers, Messrs. Mangnall & Littlewoods are engaged upon estimates for the pavilion, which will be let separately.

MONMOUTH SEWERAGE AND ELECTRIC LIGHTS.—At a special meeting of the Monmouth Town Council, held on Monday, the revised plans of Mr. Nicholas Lacey for drainage within the borough at a cost of 6,137l., were adopted. It was resolved to apply for power to borrow 20,000l., to carry on the combined scheme. Messrs. Bramwell & Harris are acting as engineers for the electric light, and Mr. Lacey for the sewerage of the borough.

ROCHDALE SEWAGE WORKS EXTENSION.—The Rochdale Sewage Works Corporation have decided to borrow 40,000l. for sewage extension, and on the 21st inst. Mr. Riensd Walton, Inspector of the Local Government Board, held an inquiry at the Rochdale Town Hall. Mr. S. S. Platt, the surveyor, explained the scheme, which includes the provision of precipitating tanks, buildings, and machinery for making use of the sludge, and the acquisition of 11 acres of land adjoining the existing sewage farm. There was no opposition.

SEWAGE DISPOSAL, CHESTER-LE-STREET.—The Chester-le-Street Rural District Council have instructed Mr. D. Balfour, M.Inst.C.E., of Newcastle-on-Tyne, to prepare a scheme of main sewerage and sewage disposal for the populous townships of Maworth and Washington in the district, having received notice from the Durham County Council, under the Rivers' Pollution Act.

DRAINAGE WORKS, GRIMSBY.—The pumping station and the new drainage works for the borough of Grimsby, just carried out at a cost of 22,000l., were opened on the 25th inst., by Alderman George Doughty. The work has been carried out under the superintendence of Mr. Marshall Petree, the Borough Engineer.

STAINED GLASS AND DECORATION.

MEMORIAL WINDOW, ST. JOHN'S CHURCH, BETHNAL GREEN.—A large stained glass memorial window was publicly unveiled in this church on Sunday last. It is erected to the memory of the late Mr. Keymer, of Whitefriars, by many friends. The subject chosen was "Our Lord Blessing Children, as being appropriate in reference to the fact that Mr. Keymer had been superintendent of the Sunday schools for many years." The window was executed by Messrs. Alex. Gibbs & Co., of London.

WINDOWS, ST. JAMES' CHURCH, PAISLEY.—Two pairs of stained-glass windows have just been placed in the east aisle of the St. James' U.C. Church by the trustees of the late Mrs. Brown, who had directed her trustees to devote a scheme of her estate to the erecting of windows, commemorative of her deceased husband. One of the conditions mentioned by Mrs. Brown was that the architect of the church, Mr. Hippolyte J. Blanc, A.R.S.A., Edinburgh, should be consulted on the subject of illustration. When the matter was submitted to Mr. Blanc, he drew up a scheme of illustration, whereby all the windows can be treated on appropriate subjects and designs in harmony with the architecture of the church. According to the scheme, the east aisle, which has six lights, is to be devoted to representations of the Christian graces. The windows now put in form part of the general design. One pair represent Charity and Hope and the other Virtue and Knowledge. The work has been executed by Messrs. Stephen, Adam, & Co., Glasgow.

FOREIGN AND COLONIAL.

FRANCE.—The annual exhibition of the "Paste des Français" will be opened at the Georges Petit Gallery on April 6. The Société Nationale des Architectes has chosen this year, as the subject of its fourth annual competition, a "Maison de Retraite" for architects, sculptors, and painters, &c.—To-day (Saturday) the President of the Republic will open the new prolongation of the Seine Railway, at the Place Médéric-Lafite, in the Bois de Vincennes. The inauguration of the new railway is announced. The annual international exhibition of Hygiene will be held this year in the Palais des Arts-Libéraux, but no date is yet fixed.—M. Duprez, architect to the Municipality of Paris, has submitted to the Council a design for a monument to be erected in Mont Parnasse Cemetery to receive the remains of workers who have been accidentally killed in the Municipal service. The design shows a stèle crowned with an ornament containing objects symbolical of the work of the workers, and a pedestal decorated with armorial bearings of the city. An allegorical statue

at Paris will be introduced leaning against the steel, which will be surrounded by a kind of hemicycle in stone.—M. Cominck has been appointed Director of the Municipal School of Art at Dijon.

—The Department of Bâtiments Civils has been making a careful examination of the condition of the Arc de l'École, about which there has been a good deal of anxiety lately. The result is that the condition of the monument is not so bad as was supposed, and that it will not require more than the repair or the rebuilding of the attic and of the pavement of the top.—The death is announced, at Pécamp, of M. Victor Hamel, a distinguished etcher, at the age of 63. He had been for twenty years a regular exhibitor at the Salon.

MISCELLANEOUS.

APPOINTMENT OF ARCHITECT FOR NEW SCHOOLS.—At a meeting of the Croydon School Board on the 19th inst. the Works and General Purposes Committee recommended that the Board be advised to permit Mr. R. Ridge to submit plans or schools to be erected on the Wildbores estate for their approval or otherwise, but that this arrangement with Mr. Ridge be not taken as a precedent for future guidance. Dr. Carpenter moved the adoption of the minutes of the Works Committee. He did not think the paragraph called for any remarks, as the recommendation was unanimously carried at a committee meeting which was attended by almost all the members of the Board. Colonel Redell seconded the adoption of the Committee's minutes, which were carried.

DRAINAGE OF THE VALLEY OF MEXICO.—According to a recent report of the British Minister to Mexico, the great works being carried out by Messrs. Pearson & Son, having for their objects the reduction in volume of the waters surrounding the city, and procuring the necessary drainage outfall, are approaching completion. In fourteen months the great waterworks of the city, the imprisoned floods of the valley, which in centuries past have been a constant menace to the safety of the city, will be opened. The canal and six-mile tunnel through the mountain range have a total length of four forty miles, and the latter is complete. The sewers of the city of Mexico form a network of covered channels, sometimes in the middle and sometimes on the sides of the streets, there being almost always gorges communicating with a system of secondary sewers that empty into a collecting sewer, discharging into the canal of San Lazaro, which conveys the sewage to Lake Texcoco. If the lake is high, water backs up into the sewers and saturates the soil under the houses and streets. As this has been the case for several centuries, the state of the subsoil under the city can be better imagined than described. Malarial and gastric fevers are almost continually epidemic, and the elevation of over 7,000 ft. is all that saves the city from a pestilence.

COUNTY MAP OF LONDON.—Mr. E. Stanford's county map of London, in twenty sheets to a scale of 4 in. to a mile, is a most useful and convenient one. The scale allows of street names being clearly printed and easy to read, while the comparatively small size of the sheets enables the whole to be enclosed in a comparatively small portfolio, which takes up little room and is convenient for reference.

ENGINEERING APPOINTMENT.—We understand that Mr. William Thomas Olive, M. Inst. C.E., late Resident Engineer on the Manchester Main Drainage Scheme, has obtained by open competition the appointment of City Engineer of Cape Town. Mr. Olive was in the service of the Manchester Corporation for a period of fifteen years.

SOUTH WALES PORTLAND CEMENT AND LIME CO.—We are informed that this company has taken over and absorbed into its own business the Aberthaw Pebble Lime Co. (Aberthaw) and the Aberthaw Blue Lias Co. (Bridgend).

EFFECTS OF THE COLD WEATHER.—Dr. A. Wynter Blyth, Medical Officer of Health for the parish of St. Marylebone, in his "Sanitary chronicles" of that parish for the month of February, refers to the discomfort experienced by most households during the recent cold weather. The arrangements generally of our sanitary appliances, he says, are ill-adapted to stand temperatures continuing for a few weeks many degrees below zero. If, indeed, such seasons frequently recurred, it would be absolutely necessary to place all soil-pipes inside the premises, to relay every service-pipe at a depth of at least three feet, and to make some very special provisions with regard to the removal of refuse. Careful temperatures taken by Mr. Sowerby at the Botanical Gardens, Regent's Park, show that the frost in that particular locality did not penetrate to quite two feet in the ground, but from this it could be unwise to argue that a depth of two feet could protect everywhere the water service; the penetration of cold will vary according to the constitution and other characters of the soil in different places; a main of 6 in. in diameter, for example, has been found frozen; it is, however, probable that so far as the soil in this parish is concerned, a minimum depth of three feet for a water service-pipe would be sufficient protection.

CHURCH BUILDING SOCIETY.—The Incorporated Society for Promoting the Enlargement, Building,

and Repairing of Churches and Chapels, held its usual monthly meeting on Thursday, last week, at the Society's House, 7, Dean's-yard, Westminster, the Rev. Canon C. F. Norman in the chair. Grants of money were made in aid of the following objects, viz.:—Building the new church of St. John, Cambridge, 1254.; rebuilding on a new site the church of St. John the Evangelist, Wortley-le-Loeds, 604.; and towards enlarging or otherwise improving the accommodation in the churches at Ash-next-Sandwich, St. Nicholas, Kent, 404.; and Imber, St. Giles, near Coddorf, Wilts, 304. A grant was also made from the Mission Buildings Fund towards adapting St. Paul's Mission Church, Barnsley, Yorks, 304. The following grants were also paid for works completed:—Grimsby, St. Paul, 1004.; Ramsbury, Holy Cross, Wilts, 504.; Trelleck, St. Nicholas, near Monmouth, 404.; Westmarsh, Holy Trinity, near Dover, 154.; Barnsley, St. Peter, 304.; and Canton, St. Catherine, near Cardiff, 504.—The annual general Court of this Society will be held on Wednesday, the 8th of May, at the Church House, at 2.30 p.m. The chair will be taken by the Archbishop of York.

NOTICE OF REMOVAL.—The Acme Wood Flooring Co., Limited, of Gainsborough-road, Victoria Park, announce the completion of, and removal to, their new saw-mills and manufactory, situated on the River Lea Navigation.

AUTOMATIC ROPE-GRIP FOR HOISTS.—This, which is patented by Mr. J. W. Martin (Manchester), is a contrivance by which a bar across the opening to a lift, which has to be raised for access to it, by the action of raising it automatically clips the hoisting rope, b-sides covering it from the reach of the attendant's hand, so that the lift cannot possibly be started while any one is getting in or out of the lift. The gripper is actuated by a short arm on the other side of the centre on which the bar turns, forming a solid portion of the bar.

ORGAN, BROADHEMBURY CHURCH, DEVONSHIRE.—An organ has just been placed in Broadhembury Church, which has been presented by Mr. C. B. Heberden, Principal of Brasenose College, Oxford. The instrument, enclosed in an oak case designed by Mr. G. Fellowes Prynne, is built by Hele & Co., of Plymouth and Exeter.

DAMAGE AT PETERBOROUGH CATHEDRAL.—No less than three pinnacles were blown from the towers of Peterborough Cathedral during last Sunday's gale, one from the north-east and two from the south-west tower, and the nave-roof has been considerably damaged. It is feared, too, that the west front has suffered. The amount of damage done to property in the city is almost inconceivable, and there is scarcely a building in the exposed parts that has not suffered.

VICTORIA EMBANKMENT.—Rutty's macadam road "Scarifier," to which we have before referred, is to be tried, we are informed, on the Victoria Embankment roadway. This will afford an opportunity for the next few weeks for those interested in road repairing and maintenance to observe its working and results.

LEGAL.

DECISION UNDER THE LONDON BUILDING ACT, 1894.

THE case of the party-wall between Nos. 1 and 3 Church-street, Minorities, again occupied the attention of the magistrate at the Thames Police-court on Saturday last. It will be remembered that in the case of Watkins v. Crow, which was reported in our issue of March 2, the District Surveyor's "notice of objection" served under Sec. 150 of this new Act, sought to compel the owner of No. 1, Church-street, to bring the party-wall next No. 3 into conformity therewith. The facts disclosed at that hearing were briefly these:—As the result of a fire in November last, the warehouse No. 3 was almost entirely down. No. 1 was slightly damaged, and the party-wall between them had been pulled down, under a dangerous structure notice. At the time that case was heard, the owner of No. 1 had given notice, under Sec. 145, of his intention to reinstate the party-wall in question. The owner of No. 3 appeared to have taken no steps towards rebuilding his warehouse. It was admitted that so far as regarded No. 1 the wall need not be altered, because since No. 1 had not been destroyed for more than half its cubical extent, the reinstatement thereof would not be a "new building," as defined by Sec. 5 (6), and it was also admitted that since the party-wall itself had not been destroyed to the extent of one-half of its superficial area it could not be dealt with under Sec. 208, but it was contended, on behalf of the District Surveyor, that as No. 3 had been destroyed for more than half its cubical extent, and the reinstatement thereof would accordingly be deemed to be the erection of a "new building," therefore every part of such building, including this party-wall, must be made to comply with the London Building Act, 1894.

It was then held by Mr. Haden Corser that since no notice had at that time been given for the rebuilding of No. 3, and the objection was given on the notice of the owner of No. 1, the party-wall must be considered in its relation to No. 1 only, and that as No. 1 had not been damaged sufficiently to bring it within the definition of a "new building,"

under Sec. 5 (6), and the party-wall had not been taken down or destroyed to the extent of one-half, so as to bring it within the scope of Sec. 208, the wall could be reinstated without regard to the requirements of the new Act.

About a fortnight after this decision Mr. Samuel Redhouse, builder, of Stofford, Baldock, Herts, gave the District Surveyor notice of his intention to re-build No. 3, whereupon the District Surveyor, Mr. Arthur Crow, served on Mr. Redhouse, a "notice of objection" with regard (*inter alia*) to this party wall; hence the present proceedings before Mr. Dickinson.

Mr. T. Seager Berry, of the solicitor's department of the London County Council, appeared for the District Surveyor. A preliminary objection was taken by Mr. Cobban, solicitor, on behalf of Mr. Redhouse, on the ground that the party-wall was the same wall which had formed the subject of the former proceedings, when Mr. Hayden Corser had decided that the District Surveyor's notice must be disallowed. Mr. Berry contended that the circumstances had entirely changed, and that they were now dealing with a building which came within the definition of a "new building," and thus a case had arisen, such as Mr. Hayden Corser had expressly declined to give an opinion on, when the possibility of its arising was suggested to him, and it was under these new and different circumstances that the District Surveyor now asked that this party-wall should be amended. In reply to a question from the learned magistrate, Mr. Cobban contended that it was immaterial whether No. 3, Church-street, were a "new building" as defined by Sec. 5 (6) or not, but that the question really was as to how far this party-wall had been taken down: if more than half, then it must be rebuilt under Sec. 208; if less than half, it need not be altered. He submitted further that both the buildings, No. 1 and No. 3, might be entirely destroyed, and yet if half the party-wall remained intact even then the wall need not be altered. Mr. Dickinson said this was a very strong suggestion to make, and Mr. Berry urged that it was going back on previous legislation, for Sec. 10 of the Act of 1855 clearly laid down that when an old building was more than half destroyed, the remainder, so far as not in conformity with the new law, had to be pulled down, and the object of Sec. 208 was to supplement Sec. 5 (6) which virtually re-enacted Sec. 10 of the Act of 1855, and not to in any way derogate from such section, and that Sec. 208 referred to the case of a party or external wall *per se*, and intended that although a building itself might not be half destroyed, yet any one wall of it, if destroyed or taken down to the extent of half, should be not of necessity pulled down but brought into conformity with the new law as regards the whole of such wall.

Mr. Dickinson, after carefully considering the Sections quoted, upheld Mr. Cobban's contention, and decided that Sec. 208, which dealt with party-walls (and external walls), must govern the case, and that notwithstanding the fact that No. 3 was destroyed for more than half its cubical extent, yet as half the party-wall had not been destroyed, the new law did not require that the wall should be made conformable thereto, and said that he ruled that Sec. 208 ousted the provisions of Sec. 5 (6) as to party and external walls. The District Surveyor's notice was accordingly disallowed.

The Magistrate expressed his willingness to state a case if asked, and declined to grant costs, saying that he considered it was a proper case to have been taken up by the District Surveyor in the public interest.

MEETINGS.

FRIDAY, MARCH 29.

Architectural Association.—(1) Mr. H. Holloway on "Specifications from a Builder's Point of View." (2) Mr. E. C. Pinks on "Specifications from an Architect's Point of View." 7.30 p.m.

Building Trades' Exhibition (Lectures and Conferences, Agricultural Hall, Islington).—Conference on "The London Building Act, 1894," to be opened by Professor Banister Fletcher. 3 p.m.

Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—Mr. H. Law on "Principles of Calculating Areas, Cubic Space, &c.; Interpretation of Plans and Sections to Scale." 8 p.m.

SATURDAY, MARCH 30.

Architectural Association.—Visit to St. Peter's Church, Mount Park-road, Ealing. 3 p.m.

Building Trades' Exhibition, Islington.—Workmen's competitive handicraft. 2 p.m.

Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—Inspection and Demonstration of Harrison & Barber's Knacker Yard, Whitechapel.

Memorial Hall, Torrington.—Mr. S. G. Ackerman on "Present Day Apprenticeships." 9 p.m.

St. Paul's Ecclesiastical Society.—Visit to the Crypt of St. John, Clerkenwell. 3.30 p.m.

Edinburgh Architectural Association.—Visit to (1) Dalmeny House, (2) The Carmelite Priory Church, South Queensferry, (3) Dalmeny Church.

Queen's College, Cork.—Mr. Arthur Hill on "The History of Architecture." XVII. 3 p.m.

SUNDAY, MARCH 31.

South Place Institute.—Mr. Sidney Webb on "The Place of Trade Unionism in Industry." 4 p.m.

MONDAY, APRIL 1.

Surveyors' Institution.—Mr. G. Cadell on "Forestry." 8 p.m.

cisterns.—5,466, J. Macdonald, Oil lamps for removing
paint, plumber's work, &c. —5,376, J. & H. White, Wood
block flooring and pavements. —5,396, J. De Lon,
Window Ventilators. —5,423, A. Cooper, Window-sashes.

The Builder.

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APRIL 6, 1895.

ILLUSTRATIONS.

The Abbeys of Great Britain: XI., Netley.—Drawn by Mr. C. E. Mallows.....	Double-Page Ink-Photo.
The Chapter House, Netley Abbey.—From a Drawing by the Editor	Double-Page Ink-Photo.
Plan, Netley Abbey.—Drawn by Mr. R. W. Paul	Double-Page Photo-Litho.
Brass of Thomas Nelond, Cowfold, Sussex.—From a Rubbing by Mr. C. W. B. Bridson	Double-Page Photo-Litho.

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The Proposed New Museum at Cairo.



THE designs sent in competition for the new museum at Cairo were opened to public view on Thursday, March 14. Not less than 73 sets of drawings are well shown in

the spacious rooms of a now disused school, but it cannot be said that the display is satisfactory. Far from it. Some schemes are absurdly ridiculous, others are as absurdly extravagant, whilst every style of architectural detail except that of Mediæval Gothic may be seen. The thing conspicuously absent is genuine architecture. The ponderous columns and massy architraves of Karnak, the wide vaults of the thermæ of Rome, and the slim walls and lofty domes of Saracenic buildings, all depend in most of these schemes upon iron ribs, rolled joists, and lattice girders; there is hardly a genuine piece of architectural construction in the exhibition. The competition is international; the names and mottoes of the various competitors have been rendered invisible. At the same time, as the descriptive writing to some is in Italian, to some in English, and to most in French, it is clear that at least these three nations are represented. One or two sets of drawings are evidently "made in Germany," and one, No. 28, must surely have come from Chicago.

Not a little remarkable is the number of projects sent, we must suppose, by amateurs, or pupils in their first year; at any rate, by people as entirely unacquainted with the most elementary systems of construction as they are with the first principles of drawing. It is affirmed that local genius is represented, and if so, some of these very curious productions may be accounted for. Amid the depressing collection of mediocrities it is not difficult quickly to select some few which are as good as the others are indifferent. The set No. 8, charmingly drawn is, we may suppose, the work of a Frenchman. It has the great merit of expressing in its façade the chief characteristics of the plan. The entrance hall consists of three parallel vaulted halls, and

these are again continued as exhibition galleries. The ends of these vaulted halls rule the design of the façade, where they appear with the entrance-doors below and the rest of their section filled with a grille of stone-work. The wing walls of the façade are without openings. Suggestions for the introduction of coloured faience are shown, but with great restraint. It is doubtful whether the plan would make a good museum, but the design has great merits and is charmingly drawn.

The rock on which so many competitors will surely have wrecked themselves has been the unfortunate effort to make use of details in the style of ancient Egypt. Rameses and all his friends and enemies run wild over the façades of these projects, obelisks bristle round about—in fact, were such buildings constructed they would be as much an indifferent collection of sham antiquities outside as they would be a repository for real antiquities within. And yet some few of these inappropriate schemes are admirably drawn, with immense pains and diligence.

Not far from the set of drawings No. 8 is an example of a make-believe Egyptian temple, and in No. 17, in the ancient Egyptian style, the columns are so numerous that there would be but little place left for exposing the antiquities.

In No. 9, which is probably the work of an Italian, we have a vast church plan, not unlike that of San Gallo for St. Peter's at Rome.

Perhaps one of the most curious sets of drawings in the ground-floor rooms is one numbered 5, which altogether departs from any known types, and there is no reason why the architect should not make such a departure; but in the present case it is done with so much eccentricity and so bad a plan that the experiment can hardly be justified. The writing on the drawings is in English, and a touch of Queen Anne leads us to suppose that they come from England. Across the whole width of the site runs a long and somewhat narrow gallery. This is absolutely plain and unadorned outside except for a round-topped door in the middle and towers at either end. Behind this is set a vast rotunda. Alternatives are given for the treatment of this space. In one alternative it is covered by a dome with an elaborate copper lantern on the top. In the other the walls

of the rotunda are carried up to a considerable height, and on the exterior are subdivided into many faces by tall pilaster buttresses, on the top of each of which stands a figure painted green, which we must suppose to be intended for bronze. The roof is flat, and the structure looks exactly like a gas-holder. Within, the flat roof is supported by a lofty stone pillar in the middle, after the manner of a Chapter House. It would be difficult to imagine a room more ugly or more ill-suited for the purposes of a museum. There is unquestionable skill in the design, eccentric and unsuitable as it may be.

The design numbered 21 has considerable merits, but the plan suffers in consequence of long narrow corridors of communication—very ill-lit—being used to join the Exhibition galleries. The galleries themselves would surely form the best corridors. The same fault may be found in several of the projects, large wall-surfaces being thereby completely thrown away.

In design No. 27 we are wafted away from ancient Egypt and find ourselves before such an Eastern palace as springs up suddenly in "the Arabian Nights." A vast court-yard is surrounded by the Exhibition galleries. A dome, rising far into the air and surrounded by many pinnacles, surmounts the entrance, to retrieve the dulness of the walls on either side, which are not pierced by windows; some very slim arcades are introduced which lead nowhere in particular.

On the first landing of the staircase hangs the set of drawings already mentioned, No. 28. They are most carefully studied in all details, and set forth with that brilliant facility in which our French neighbours so much excel. The bluest of blue skies hangs over a prodigious pylon, in the gigantic cornice of which the reflected sunlight gleams. On the symbol of the winged disc tall masts with flaunting flags stand before the massive pylon. The cornice and the columns which flank the door are enriched with polychromy, whilst the wall surfaces stand forth in simple majesty unadorned.

The great central composition is flanked by long wings in the style of the centre. Within, a great gallery runs the whole length of the façade, whilst another leads straight away from the door, forming on plan a sort of I reversed. When we look at the sections the illusion vanishes away. All this

parade of Egyptian massiveness is to be made of some material but little thicker than carton-pierre, and with this a construction of iron or steel lattice is encrusted. We have the Chicago Exhibition buildings over again. The exhibition galleries are shown as roofed entirely with glass. The galleries would in the summer be simply furnaces.

On the upper landing and hanging on the walls of the stairs are some extraordinary productions. In one we have a vast octagon rising in diminishing stories, and suggesting the towers of Babylon; in another we see a palace in the Rococo style of St. Petersburg; and on the front of a third Rameses the Second has his enemies before him upside down as we may see them at the Ramessium at Thebes.

In No. 33, although it is in the Egyptian style, there is some excellent work. It seems, however, doubtful policy to occupy so much room with a very grand staircase, more particularly when the stairs lead away from the principal floor, and up to galleries of very secondary dimensions. Under the stairs, and in each corner of the courts, are apartments which would be nearly dark.

In No. 38 we again find ourselves before a set of drawings admirably carried out. The plan is simple and direct. A wide hall with arched roof leads directly away from the entrance, where it is crossed by a gallery of less importance running the whole width of the face. The wide hall is flanked by large exhibition courts, and these are surrounded on the ground and first floor by galleries. The details of construction are better shown than in most of the drawings. The lighting is well arranged, with long lanterns, solid at the top but pierced with windows at the sides, a system which was so eminently successful at the old Boulac Museum. The detail of the interior decoration is a mixture of Egyptian and Roman. The coffered and vaulted roofs remind us of the great halls of the Thermæ, and galleries carried on columns crossing the large arched openings carry further the impression. The capitals of the columns and many other details are, however, inspired by a study of ancient Egyptian buildings. The exterior is also remarkable for the same mixture of detail, or, it would be more true to say, of inspiration, for there is no direct copying. Well carried out, there is no reason why such a plan should not be very successful.

No. 41 should only be referred to as a comicality. It shows a pyramid 100 metres high and some 150 or 180 metres wide at the base built in large steps. In the risers of these are windows and in the trends skylights! This remarkable structure would be hollow within, the steps of the pyramid being supported by iron legs which get longer and longer the nearer we reach the centre of the floor-space. On the plan we find some passages which cannot be accounted for in the section, but these passages are so very long that the architect spells them "corridor" with three "r's." All the paints in the colour box are exhausted in depicting the beauties of the edifice, but, unfortunately, the drawings are not to the prescribed scale as set forth in the programme, and consequently it is to be feared that the author has placed himself *hors concours*.

In the set of drawings No. 46 we see the hand of an artist of conspicuous ability. Beautifully drawn, the elevations show us a building with a terrace in front whereon are displayed many large specimens of sculpture, which, it is supposed, might be placed in the open air. The façade of the museum is in two stories, the lower consisting of seven arched openings in a massively-rusticated wall, on which stands a colonnade of the Corinthian order, on the blank wall behind which some coloured decorations are shown. The seven arched openings, all exactly alike, are not quite logical, as they are not, in fact, all doorways, whilst the colonnade above is of no use at all, but is set up "for glory and for beauty." Curved roofs of lead or copper rise above the balustrades and crown with square domes two

angle loggie which would give fine effects of shadows to the façade. This architect, differing from all the other competitors, makes his first floor more important than the ground floor, and so far justifies himself for the extraordinary amount of space occupied by the stairs. It is not unfair to say that the museum would be a series of rooms attached to a staircase. The architectural treatment of this part of the design is exceedingly clever. Columns, piers, arches, and vaulted halls open on either hand, but the floor areas would be very ill-lit in many places, whilst wall space is everywhere conspicuous by its absence. As a gallery for sculpture the design might be acceptable, but it seems grievously ill-fitted for a museum of Egyptian antiquities.

In the set of drawings No. 48, we again find a design as beautifully drawn as it is carefully studied in its details. Unfortunately the author has not written upon the plans the destinations of various parts of the building, and, so far as can be surmised, sundry departments are either forgotten or ill-provided for. The plan is exceedingly simple and direct. A large hall, 18 metres wide, runs across the whole width of the building and is closed at either end by a staircase. From the farther side of this hall run seven parallel halls, offering, with the great hall of entrance, a very large amount of wall space and a fine amount of floor area very suited for the classification of the objects exhibited. On the north, west, and south sides of the rectangle which is formed by these halls there is a series of small rooms lit from the side (the rest being all lit from above). These rooms are surmounted by a similar series on the first floor. The amount of wall-spaces thus secured is very large, but it is doubtful whether so great a number of small rooms would be found suitable. The façade is a fine composition. The colonnades (perfectly useless) which flank the central mass of the entrance are Ionic in type, but a breadth and mass are given to the work which are Egyptian, and a slight batter to some of the walls adds to the effect. The design is the work of an artist of high ability and refined taste.

The drawings No. 49 are deserving of study. A large area of ground is covered. A central hall rising into a square dome, which shows above the adjoining buildings, but which would not, in fact, form the prominent feature it does in the elevations, is closely surrounded by courts and galleries, all well lighted and well arranged for the purposes of the museum. The library stands forward in a wing from the left angle of the building, and, with the *salle de vente* correspondingly placed on the right, is accessible from within or from outside. The offices of the administration are also well placed; in fact, this plan seems to meet the requirements of a museum exceedingly well—better, perhaps, in some respects, than that of No. 48; but in artistic character it is markedly inferior. There is in it nothing of the monumental. The front has a suggestion of the Palais Royal at Paris, whilst the central hall has in it flimsy iron columns and girders only suited to a temporary structure.

The design No. 56 is for an astonishing structure in the Hindoo style; parts of it are not less than three stories in height, and above these rise countless little domes and minarets, which the museum authorities would be at no small charges to maintain.

The author of the design No. 60 has not complied with the requirements of the programme as to accommodation. A long cruciform plan is set diagonally on the site, and not with its façade towards the principal street on the east, as prescribed. The drawings are indifferently executed, and the details of construction seem but imperfectly studied; indeed, it may be doubted whether, as shown, some of the buildings would stand. The detail is more or less Saracenic, and the walls and arches are banded with red

and white. An entrance block, surmounted by a small dome, leads by an ignominious way under the stairs to a long nave, very lofty, with galleried aisles on either side. The junction of the nave with its continuation and with the transepts is surmounted by a tall and ill-shaped dome, which seems to have very inadequate support. A row of little windows is pierced through the vertical wall of the dome; the central space could not be otherwise than very imperfectly lighted. Classification in a building thus planned would be difficult. Additions as the collection increased do not seem to be provided for.

In No. 62 there is shown a very simple and direct plan, resembling, in some respects, that of design No. 38, already mentioned. Rooms to be lit with artificial light only are a prominent feature in the plan, and are permitted by the programme. The façades are not without considerable merit. They are free from all useless colonnades and superabundance of architectural detail. Here and there we are reminded of ancient Egypt, but the general effect is of a building in the Italian style, with large wall-surfaces, and surmounted with a good cornice and simple roof.

So far as can be judged by the style of drawing, &c., the best designs seem all to come from France.

When the decision of the jury is arrived at the papers which cover the names or mottoes will be removed.

The above remarks were written before the award had been made and before any names of the competitors had been divulged. Since it was written the Technical Committee have presented their report to the general committee, in which they have recommended that no first premium should be awarded, as no one set of drawings came sufficiently near meeting the necessities of the case, while four were so good as to be worthy of a premium. Accordingly, the following were recommended for a premium of 25*fr.* each:—

- No. 38, by M. J. Bréas.
- " 46, by MM. E. Loviot & Cassian.
- " 48, by MM. Guilhem & Gillet.
- " 49, by M. Marcel Dourgnion.

All of Paris.

No. 62, by M. Tranchet was recommended for a second premium, and Nos. 8, 28, 33, and 71 were recommended for honourable mention.

English architects seem to be out of it altogether, and we regret to add that so far as the designs were concerned they did not merit otherwise. Many of the best architects in this country were possibly disinclined to enter into a competition for a building which they would probably have had no control over, and which would have been carried out under the immediate supervision of some minor Government official.

NOTES.



E quite agree with the purport of a letter which Mr. William Morris has addressed to a daily paper in regard to the west front of Peterborough Cathedral, that the main point we should all look to is that the front should be preserved from danger as it now stands, not that it should be pulled down and rebuilt. It was in that sense that we urged last week that its preservation was a matter of more than national interest. Mr. Morris seems to have a dread that its "restoration" will be attempted. Such an idea had not entered into our consideration; but we quite agree with Mr. Morris that, if there is any chance of that, we ought to be told plainly, before we subscribe anything, exactly what is going to be done with the money. The front "restored" would be of no value; we want it preserved.

IN regard to the two papers read at the Architectural Association, and printed on another page, we fear we must confess that we are far more in sympathy with the contractor's than with the architect's paper. The complaints in Mr. Holloway's paper in regard to the light-hearted generalisations often found in architects' specifications (especially, we imagine, in those of young practitioners in the ranks of "art-architects"), by means of which the onus of finding out what "is really wanted is thrown upon the contractor, without leaving him a fair chance of estimating its precise cost beforehand, are we fear only too just, and one is disposed to admire the long-suffering of contractors in regard to specifications, in which many things are generalised, but everything is to be "best" and "to the satisfaction of the architect." In regard to Mr. Pink's paper we agree with him (and we observe that the President of the Association also does) that a great deal more might be usefully done in the way of representing and defining materials on the drawings themselves; we have always been in favour of this method as far as it can be carried out without overloading the drawings with notes, as it is a clearer and more immediate manner of indication than a separate written description. But this method cannot possibly be applied to such an extent as to dispense with the necessity for a detailed specification; and, beyond what can be clearly and unmistakably defined on the drawings, the more detailed and precise a specification is the better; for two reasons. In the first place, when buildings are carried out by contract, and competition cuts everything so close, it is unfair to the contractors not to give them the most detailed information of what you mean to require of them, and leads to random estimating and attempts to get things right by clipping and saving under the rose. In the second place, there is nothing better for the architect (especially a young architect) than careful and precise specifying. He then begins to think and realise what he precisely wants and how it is all to be done; he knows his projected building through and through, and sees in his mind's eye how it is going to be put together. Moreover, let us add, an architect who will not undertake what he thinks the drudgery of precise specifying will end by finding himself a tool in the hands of the quantity surveyor.

CONSIDERABLE interest has been taken in recent years in the researches of English seismologists resident in Japan, in regard to methods of constructing buildings and engineering works in earthquake countries. No one has contributed to our knowledge in these matters to a greater extent than has Professor John Milne, F.R.S., of Tokyo. We have on more than one occasion devoted space to the results of his observations, and it is now with profound regret that we note the destruction by fire in Tokyo, on February 17 last, of practically all the original records, extending over twenty-five years, on which his chief conclusions as to foundations and kindred subjects were based. The practical uses to which seismology has been put by him are too well known to architects, and especially to engineers, to need recapitulation at the present moment. The records now destroyed comprise many valuable unpublished notes as to the effects not only of great earthquakes, but of smaller earth tremors which are believed to exert considerable influence, in the aggregate, on the stability of buildings. We know that Prof. Milne has, during the past two years, been actively engaged in working out particulars as to vibrations in buildings, and it is much to be deplored that the innumerable facts as to earthquake movement, from which alone he would have been able to arrive at precise results, should now be lost for ever. Information as to this disaster has only been received in England during the past few days, but the Geological

Society, at the instigation of its President, Dr. Henry Woodward, F.R.S., has lost no time in calling attention to the matter. At a meeting held on Wednesday last the Council passed a resolution of sympathy with the distinguished Professor, and it was observed that seismology in all its bearings had received a serious blow from which it could not recover for many years.

THERE are many people who carefully avoid walking on the lids of the street-boxes of the electric lighting companies. The sensational paragraphs that appear in the evening papers are mainly responsible for this, but an attentive perusal of Major Cardew's report on the Southwark Bridge explosion may increase the number of the careful ones, especially in frosty weather. The Cannon-street accident must be considered as due to a blunder on the part of the City of London Electric Lighting Company, but they have since taken precautions to make a recurrence quite impossible. The risk that one runs in walking over or near a street-box is of being blown up in the air or of being hurt by flying debris due to a gas explosion which may be caused by the gas leaking from the gas mains coming in contact with the match of the smoker who drops it down a grating, or possibly even, as Major Cardew suggests, from the spark formed by a horse's hoof striking a flint. The Southwark Bridge explosion, too, proves conclusively that a whole series of explosions can travel along the electric conduits. On that occasion there were five separate explosions, and if it had occurred later on in the day, when the gas had penetrated further along the conduits, there is no saying how many explosions would have occurred. Each individual explosion may not be very serious, but most people would object to being raised suddenly 6 ft. or 7 ft. in the air, as a man on the bridge was, according to the evidence of a policeman. A whole network of mains is laid under the streets of the City, and what occurred on Southwark Bridge might very well happen there, possibly with much more serious results. Hence Major Cardew thinks there is cause for anxiety, and thinks it imperative that the Board of Trade should compel the City of London Electric Lighting Company to take the necessary measures to secure the public safety. We shall probably, therefore, soon see the company filling up their boxes with incombustible material of some kind. In his report Major Cardew has nothing good to say of the gas companies, the primary authors of all the mischief:—

"It again directs attention to the very serious danger to the public arising from the condition of the gas-pipes in many districts, and the way in which they are laid and supported—a danger which is continually increasing, owing to the spread of the use of wood-paving and other impervious substances, and which is temporarily intensified by every severe frost."

The report, as we have said, may add to the fears of the timorous ones, at least for the present; but it may calm them to know that their enemy is coal-gas, and that there is no fear of a sudden shock-electrocuting them on the spot.

FROM the report by Mr. T. W. Thompson to the Local Government Board on the Water Supply of Lymington (Axbridge Rural District), it appears that this parish is in a very unsatisfactory state as to water supply. The land on which Lymington is situated is very flat, and intersected by large ditches, which unite at various points to form main dykes, or, as they are locally called, "rhynes." The soil immediately beneath the surface mould consists of clay to a depth of some 10 ft. or 12 ft., below which there is a stratum of peat. The general sanitary arrangements of Lymington are of a very unsatisfactory character. Slop sewage and the drainage from piggeries is discharged directly into the ditches. For

excrement disposal privies are in general use, and in many instances are constructed on the banks of ditches, into which they discharge. When this is not the case, they usually discharge into under-ground pits or cesspools, which are not generally so constructed as to prevent soakage from them into the surrounding soil. Consequently the ditches and rhynes are seriously polluted, nuisances from this cause abounding in the village. This pollution of the ditches and rhynes has an important bearing upon the question of water-supply in the parish. Water-supply, so far as the parish of Lymington affords it, is obtained either from wells, ponds, or ditches and rhynes. The wells almost entirely consist of "shallow wells" sunk into the clay, which they do not completely perforate—perforation of the clay having apparently been expressly avoided with a view to guarding against the admission of water from the peat formation below it. Internally, the wells are dry-stained with rough stone. Many of them are covered over and provided with pumps, but others, usually provided with movable covers, have no pumps, the water being obtained by dipping with some vessel attached to a stick or chain. These wells afford a highly unsatisfactory source of supply. Not only are they liable to fail in years of low rainfall, in which case the cottagers have recourse to water from the ditches and ponds, but it is clear that they must be in frequent danger of pollution. As a matter of fact, too, some of them are situated but comparatively short distances from drains, privy cesspools, or highly polluted ditches. Mr. Thompson concludes his report by a strongly-expressed opinion that it is the duty of the Axbridge Rural District Council to take immediate steps to provide a proper and wholesome water-supply for Lymington.

WE lately adverted * to the sale for building purposes of the "Ivy Lodge" estate, in Fulham-road. As will be seen from an advertisement in our columns of last week, another notable old house in that locality is also to be pulled down. It is "Munster," sometimes called "Mustow House," which stands by the main road, opposite the site of Fulham Lodge (home of George Colman the younger and the late Duke of York), eastwards of Ivy Lodge, and nearer Purser's Cross. There is a tradition that it had been, with an extensive park, a hunting-seat of Charles II. But that story seems to be falsified by the fact, stated upon documentary evidence by Lysons, that during the greater part of the seventeenth century it formed the residence and property of Sir William Powell, Bart., and his predecessor, Sir Edward. The name is supposed to be derived from King George I.'s favourite, the Duchess of Munster. The Powells were here succeeded by Sir John Williams, Bart., who married Mary, sole daughter and heiress of Sir William Powell, of Pengethley. The house next served for a school, and was afterwards occupied, until about 1822, by J. Wilson Croker, M.P., when Secretary of the Admiralty, who somewhat altered the exterior, and added the brick embattlements. For some years past Munster House has been occupied as a private asylum.

THERE has seldom been seen, at private view days at the Society of Fine Arts, an audience so intent on the works exhibited, as on Saturday last, in the room which contained Sir John Tenniel's drawings. The usual social and conversational element at a "private view" seemed almost in abeyance, and every one was diligently looking at the drawings. The majority of these, for the weekly cartoons in *Punch*, are in pencil, and the engravings are not therefore facsimiles of the artist's line. Admirable as they

* See "Note," December 22 last.

appear in *Punch*, a study of the original drawings gives one a much higher idea of Sir John Tenniel's delicacy of style and finish than we ever receive from the cartoons in their published form. On this account alone, it is worth while to study them. The larger drawings in ink, made chiefly as double-page plates for *Punch's Almanack*, were we presume reproduced automatically. The play of humour in some of these, and the varied power of what may be called refined caricature of all kinds of types and characters which they display, are very remarkable; perhaps one of the most delightful of all is "The Vision of Utopia" (55), a thing the study of which ought to have quite a Christianising influence on persons of evil and quarrelsome temperaments. But in the cartoons it is not only the power of drawing that we admire, but the power of tragic and pathetic expression which many of them display; the faculty of concentrating a whole political or national situation in a single emblematic figure. Such are "Germany's Ally" (6), the figure of starvation on the Paris ramparts; "Vae Victis," where the figure of the German Emperor riding into the gate of Paris seems to sum up the whole character of the Teuton conqueror; the impressive figure of Bellona stirring in her sleep, "Unrest" (108). One of the finest of all the serious cartoons, "Dropping the Pilot," is not here, because it was purchased by an English statesman as a present to Prince Bismarck. The humorous cartoons are fully as good in their way, and one is struck by the admirable skill with which the predominant characteristics of eminent public men are seized and portrayed; but it is the serious ones that show more especially what a great artist Sir John Tenniel is, not only in power of execution but in intellectual force of conception. What a refreshing contrast do these works present to those of Rowlandson, the last satiric artist illustrated in the same room.

AMONG other picture exhibitions opened this week is a collection of bright and spirited architectural sketches from Tunis, Algeria, Tangiers, &c., by Mr. Ernest George. These are also at the Fine Art Society's Gallery. We suggested when there was an exhibition of Mr. George's sketches of architecture at this Gallery some time since, that the colour and tone seemed to be too much the same in sketches from different parts of the world. In the present collection these Oriental subjects seem to be treated with much more distinctive colour. Among the most effective are "The Old Harbour and Lighthouse, Algiers" (19), the "Old Church, Gibraltar" (33), and "Old Houses by the Harbour, Algiers" (39). Messrs. Arthur Tooth & Sons' Spring Exhibition at their Gallery in the Haymarket contains among other things a beautiful work by M. Dagnan-Bouveret, a half-length figure of a "religieuse," under the title "Vespers" (12); an interesting picture by Bastien-Lepage, "Pauvre Fauvette" (35); a Girl's Head by M. Jacquet, under the title "Mignon" (74), which is a masterly piece of painting; Mr. H. W. B. Davis's exquisite picture "Summer-time" (52), formerly in the Royal Academy; and a good many other works of interest. This exhibition also contains one of the finest pictures of Highland cattle and mist that Mr. Peter Graham has ever produced, and a very interesting little bronze statuette, "Truth," by Mr. J. Mackennal. At Mr. Maclean's exhibition in the Haymarket are to be seen several very interesting works, a splendid view of his favourite "Arundel" by Mr. Wimperis (68); two or three admirable cattle scenes by Mr. Louis B. Hurt, a painter whose name we are not familiar with; some good works by Mauve (apparently early, they are not in the tone of his later and better-known manner); a fine still-life painting by Vollon; "Grace before Meat," by Israëls; a very good architectural painting by Mr. Bauernfeind, "Entrance to the Temple at Damascus," in which the

decorative bronze doors in the foreground are splendidly executed; and other good works by M. Clays, Mr. Peter Graham, Mr. M'Whirter, Mr. Henry Moore, &c.

THE Bach Festival which has been held on three evenings this week at the Queen's Hall afforded forcible illustration of the mistake of planning an orchestra with no knowledge of or consideration for the requirements of large performances. In an acoustic sense the Queen's Hall has been a great success, but the orchestral provision is utterly wrong; the orchestra is larger than necessary for a band, so that for instrumental concerts space is wasted, and a great deal too small for a band and chorus. The consequence is that no great choral work can be adequately given there, and the Bach Festival was necessarily given with a chorus of most inadequate numbers, though the orchestra was packed as full as it could hold. That is what comes of architects planning music-rooms without knowing anything about the requirements of music. The Queen's Hall is now the accepted favourite hall in London, and in many respects deservedly so; but no great choral compositions can ever be adequately given in it, because there is no space for a sufficient number of performers. It is now too late to amend this; it is not likely that another large concert-hall will be erected in London for some time to come; and for any adequate performance of large choral works we are thrown back on the Albert Hall, which, on the other hand, is much too large for solo singing. There is absolutely no building in London, for choral compositions, to supply the place of Exeter Hall; and there might have been, if those who were concerned in planning the Queen's Hall would have taken more trouble to find out what is really required for large musical performances.

LETTER FROM PARIS.

THE committee of selection at the Old Salon, presided over by M. Paul Laurens, have had about five thousand pictures and pastels before them, from which to select the average number of about eighteen hundred works for which room can be found, in addition to the works which previous "recompenses" have exempted from the discretion of the jury.

At the Salon at the Champs Elysées the committee of selection has been presided over by M. Lhermitte, whose vigorous talent will be represented this year at the Champ de Mars by a masterly work intended for the Hôtel de Ville, and which will take the title of a celebrated novel, "Le Ventre de Paris." The scene is in the Halles Centrales, at the time in the early morning when business is in full swing—peasants arriving from the country, porters carrying heavy loads to and fro, with a background of game, fruit, fish, and other articles exposed for sale at the Halles. It is a powerful work in every way, and will probably attract much attention.

The Champ de Mars Salon has been occupying much public attention lately in regard to the promise of the Society to take part in the approaching art exhibition at Berlin, which has been much discussed—too much, perhaps—in the Parisian press. One set blame the French artists bitterly for what they call unpatriotic action in accepting the German invitation; others maintain that the true patriotism is to show courtesy to a nation with which we are in diplomatic, commercial, and artistic relations; which is certainly the reasonable view. French comedians have recently made a German tour, French musicians have had their works performed in Germany, and French painters have sent their works to Munich without any question being raised: why blame those who send their works to Berlin? The procedure is as foolish as the hissing of Wagner's works, which took place seven or eight years ago in Paris. The very people who make this kind of outcry would be the first to complain if Germany refused to contribute to the 1900 Exhibition at Paris.

The works for this latter will probably be actually taken in hand about September, if there is no delay from Parliamentary procedure. For the convenience of the artistic bodies which exhibit at the Palais de l'Industrie, the Govern-

ment has decided to defer the demolition of that building till the last possible moment. The "Société des Artistes Français," and the "Musée des Arts Décoratifs," will, therefore, still have at least four years undisturbed. The Champ de Mars Salon, however, seems to have its existence more directly threatened by the demolition of the Palais des Beaux-Arts, and the Société Nationale is endeavouring, in view of this difficulty, to obtain permission for the use of the Orangerie of the Tuileries. This will be, however, a very poor site for their exhibition, after their splendid quarters at the Champ de Mars.

The opening of the new section of the Sceaux railway took place this week. The President was prevented by illness from being present. The Municipal Council of Paris was unrepresented for very different reasons. The opening of the new line would have been a great satisfaction to the neighbourhood, had it not been for the high-handed and illegal procedure of the Orleans Railway Company, which has encroached upon property all along the line, and refused to pay compensation either to private owners or to the City authorities. The latter, unfortunately, are hardly in a position to contend with the great railway companies; and in consequence the Minister of Public Works, as the result of some "interpellations" in the Chamber of Deputies, has on its own authority, suspended the works in progress by the "Ouest" Company, on the Esplanade des Invalides, for the establishment of the future station, where the soil had already been turned up and the fine trees cut down. However, thanks to this Ministerial intervention, the Esplanade will probably be preserved, and the new line be continued in a tunnel as far as the Cluny Museum; this prolongation will be an important contribution towards the much-desired metropolitan railway system.

This is the time when small exhibitions abound. That of the "Rose Croix" has opened its doors amid profound indifference. The crowd of eccentric advertisements initiated some years ago by Peladan no longer has its effect, and the Parisians are tired of the mystic and often ridiculous compositions exhibited by this society. The few artists of real talent whose works used to be found there, such as MM. Maurice, Osbert, and Chabas, have gone to exhibit elsewhere, much to the advantage of their works.

The Société Internationale has opened a new exhibition at the Georges Petit Gallery, at which may be seen two good works by Mr. Whistler, a Parisian landscape by M. Aman-Jean, some pretty portraits by M. Alexander, a good landscape by Mr. Johnston, and other works by MM. Brouillet, Grimeund, Thaulow, Sinibaldi, &c.

There is little to say about the "Bretons de Paris" Exhibition, except for a landscape by M. Ary Renan; still less about that of the "Femmes Peintres et Sculpteurs," which has just closed. But special mention must be made of the exhibition of Oriental painters at the Durand Ruel Gallery, especially in regard to the collected works there of Alfred Delacour, a powerful painter who died a few years since, and who painted scenes and figures in Spain and Africa with splendid colour and intensity of effect.

After months of inaction, the committee for the decoration of the Hôtel de Ville has renewed its labours, and its first business has been to pronounce the official rejection of the pictures by M. Bonnat and M. Puvion de Chavannes. The committee, which has adopted the principle of making the Hôtel de Ville decorations a representation of all the best contemporary art, has allotted a room to M. Jules Cheret, where he will be free to indulge his light but clever vein of artistic fantasy. In regard to M. Forain, the caricaturist, to whom it was proposed to allot a room in the building, decision has been prudently postponed. The suggestion seemed absurd, since M. Forain, who is an admirable humourist in drawing, is about as little of a decorative artist as possible. M. Willette, another caricaturist, would have been a more reasonable choice, since he has shown that he has the temperament of a painter and a colourist when he chooses to exercise it.

Visitors to Paris have for a long time observed with surprise that the church of St. Eustache, though one never sees anyone working at it, appears to be permanently surrounded by scaffoldings and palisades. The fact is, this church, one of the most interesting in Paris from an artistic point of view, is so dilapidated at certain points as to be dangerous. As the mischief gets worse every year, the Department of Architecture has at last called upon the Municipal Council to remedy it. The question is at present under the consideration of that body,

to it is expected will endeavour to preserve a building, in spite of its being a religious edifice, which is one of the finest architectural monuments in Paris.

As we have already mentioned, the late Jean Gigoux has left his fine collection of works of art to Besançon, his native town, with the condition that they are to be appointed, as curator of the "Musée Gigoux," his favourite pupil, M. L. Lapret. If the collection has not been already accepted by the town within eighteen months after the painter's death, M. Lapret is to deliver the collection to the city of Paris for one of its museums. M. Gigoux, it is true, has left two important pictures to the Louvre, a Van Eyck and a Rubens, but it is to be regretted that his remarkable collection should have gone as a whole into our National Gallery of Art, instead of being hidden away in a provincial museum.

Following the recommendation of the Institut, the Minister of Fine Arts has appointed the Abbé Duchesne as Director of the Ecole Française at Rome, in place of M. Geoffroy, who has resigned. It is an excellent choice, for the Abbé Duchesne is well known in the learned world for his numerous theological works. He is one of the most noted members of the French clergy, and since 1866 has been Professor of History and Archaeology in the "Faculté Catholique" of Paris, and also an ex-member of the Society of Antiquaries of France.

Several talented artists have died during the month, whose names have been already mentioned in the *Builder*, but who claim a short graphical notice.

M. Charles Delort, who has died at Algiers at the age of fifty-four, was a painter who excelled in anecdotic subjects of the eighteenth century, which were a good deal engraved and became popularly known. He was a pupil of Gleyre and Gérôme, and obtained the Cross of the Legion of Honour in 1889.

By the death of M^{me}. Berthe Morizot (Berthe was her real name), we have lost an artist eminently original and personal talent. She exhibited at the annual Salons since 1864, her later development was much owing to the influence of Manet, whose brother she had married. She had been successful in turn with portrait, interior scenes, and landscape, treating in each class of work with admirable technical ability. At the time of her sudden death she was the height of her reputation.

M. C. E. Armand-Dumaresq was one of the many painters most in vogue at the close of the Second Empire. He was born in 1826, and died under Couture. He made his first appearance in 1851, with a picture of "Christ at the Tomb," and exhibited the following year "St. Bernard Prêchant la Croisade." But religious painting soon gave place to military scenes, which became his specialty. Among them may be mentioned "Bataille de la Moskova," various episodes at Solferino, a "Charge de Cuirassiers," "Eylau," "Le Retour de l'île d'Elbe."

In 1859 the Ministry of War commissioned him to produce illustrations of the forms of the different corps of the Imperial army; and in the Exhibition of 1867 he exhibited an interesting collection of illustrations of the popular costumes of France. Remarkable for his urbane and refined manners, Armand-Dumaresq won the regard of every one, and Napoleon III. had a special esteem for him, so much that the artist returned by a fidelity to the Emperor in his hour of misfortune, such as is unfortunately rather rare in these days.

THE ARCHITECTURAL ASSOCIATION.

SPECIFICATIONS FROM TWO POINTS OF VIEW.—AN ARCHITECT'S AND A BUILDER'S. The ordinary fortnightly meeting of the Architectural Association was held at 9, Conduit-street, Regent-street, on the 29th ult., Mr. E. W. Untford, the President, in the chair.

The minutes of the previous meeting having been read and confirmed, Mr. Banister Fletcher, junior hon. sec., proposed a vote of thanks to Mr. J. M. Brydon for conducting the business of the Association over Chelsea Town Hall, Polytechnic, and Free Library on March 16. The vote was unanimously accorded.

The President said he regretted to announce that Mr. Pinks, who was to have read a paper on specifications from an Architect's Point of View, was unable to be present owing to illness. That gentleman's absence, Mr. Fletcher had kindly undertaken to read the paper.

Mr. Fletcher then read Mr. Pinks's paper, which was as follows:—

In reading a paper before you with the title of

"Specifications from an Architect's Point of View," a word of explanation is necessary perhaps to account for a surveyor undertaking the task. Our interests are identical, and as the surveyor is frequently left to explain the architect's intentions in the specification, there is no reason why he should not be able to look at the matter from the architect's point of view. Of course, you must understand I am speaking my own views only in what I am about to say, and not those of any architect or architects in particular; but I hope the remarks I have to offer will not be considered out of harmony with the title of the paper.

I regret I cannot introduce to your notice anything novel or fresh in the art of writing and arranging the clauses of a specification, neither can I suggest any improved or rapid method of preparing the document. But I propose to examine critically the specification as it is; to pass from that to a consideration of the necessity of specifications as they are at present drawn; and thence to a few suggestions for the abolition of specifications as separate documents in a contract.

Take one of the latest of our specifications; does it not strike you that it is an inordinately lengthy document as compared with those written say twenty years ago, and that a mass of matter is now squeezed into its pages that serves only to perplex the clerk of works and worry the builder? Does there not seem a desire to make a record of length and number of pages? Why, even a moderate-sized house requires at least 100 pages of specification nowadays to adequately describe the best way of building it! Perhaps you may urge that a great deal of this is due to the fact of the surveyor writing the specification, but that is not really so, for if a surveyor had his way he would make the specification simply a reduced copy of his bill of quantities, and a specification frequently exceeds the number of pages of the bill of quantities. I think a great deal of the extra length can be accounted for by the introduction of most of the "conditions of contract." These properly belong to the "contract" as the legal document, and only cumber the pages of what should essentially be the working document. An objection also to the incorporation of legal clauses with those necessary for the builders' guidance, is that a possible slight variation in the language of a legal clause which appears in the specification and contract may lead to litigation to settle the difference. I know of a case in which the specification gave as the time to complete the building eighteen months, and in the contract, by an error, it was stated as eight; but it caused much delay and squabbling before the difficulty was settled.

Another cause of lengthiness is the way in which expanded descriptions of trade manufacture are worked in. I saw a specification the other day in which the architect or his surveyor had devoted some three or four pages to a technical description of how to make terra-cotta. I do not suppose the makers would be influenced in the least by this, certainly not the builder; for each manufacturer would have his own way of doing it, and would not vary the custom of his works to suit a particular specification.

Do the wonderful little essays on how to lay drains, make terra-cotta, mix cast-iron, test steelwork or ironwork, which we find in so many specifications, protect our clients or help forward to any serious extent the good and efficient workmanship and materials we all desire to see?

The system of splitting up a specification, rigidly, into trades has much to answer for in introducing elements of confusion and differences. Each architect has his own view as to where a certain article should go, and if he consistently follows out the trade system what a number of references have to be made before you find out all about a window, for example. On one page the sash and frame; on another probably the fastener and sash-lifts; on another the iron tongue; on another the linings and architrave; elsewhere the glass and so on! There are many of these cases where four or five references might be profitably put together, especially when you remember that the practice of allocating the items under trade headings differs considerably. For instance, tile pavings and wall linings get put into the bricklayer by some, mason by others, and plaster by others. Then the concrete bed for the tile pavings, and rubbish under, and the cement surface for laying the tiles on get into different sections, and so in a simple tile floor we may have to make four or five references before we get it complete. I need not mention many other instances of the difficulty of breaking up the specification into trades, as they will occur to all; but what I want to emphasize is that a great deal

of time might be saved by combining things together a little more than is done, and let the trade distinctions take care of themselves.

The phraseology of the modern specification also leaves much to be desired, especially in the constant use of words defining quality. The words best, very best, proper, perfect, &c., are all relative terms of quality which frequently are quite differently interpreted by the architect and builder, the one using the word in the ordinary sense, and the other in the manufacturers' sense. It is no uncommon thing to find in a trade catalogue the expression "extra super best," as meaning something superior to that described as "best"; and although it seems absurd to encourage such superlatives, if you want the best you have to go beyond the ordinary English meaning of the word, and accept the grandiloquent language of the catalogues. The word "proper" is a frequent stumbling-block, and its use should be discouraged as much as possible, especially in the sense in which we find it, as for instance "fir proper door frames." These relative terms of quality should be quite abolished, and the definite expressions of the manufacturers used instead, as by so doing we shall, as regards materials at all events, have a common basis of agreement with the builder. At present quality is left too much to the imagination, and is only implied when it can and should be stated in exact terms.

A common defect is the frequent disagreement between the specification and the drawings it is supposed to describe. In the great majority of cases this arises from the habit of writing a specification and using an old one as a model, and so we get materials specified which the architect does not intend to use, and when the work is being carried out points of difference arise. If quantities are supplied the surveyor can easily adjust the variations in description, but assuming their absence, each person tendering puts his own construction upon the clause, with the inevitable result that whichever way the architect wants the work done an extra ensues. Of course there are builders and builders, and the architect has to be prepared for the worst type in these days of close competition.

I think the subject can be narrowed down by asking yourselves, which do you consider the most important part of the contract, the specification or the drawings? I need not pause for a reply, because, of necessity, the drawings must be the paramount factor with the architect and builder, although the employer often attaches more importance to the specification, probably because he understands and can criticise a written description, whereas, alas! drawings to the average employer are like maps to a South Sea Islander.

Does it not come to this, then, that more work on the general or small scale drawings, and less in the specification, would tend to considerably reduce the friction between architects and their clerks of works and the contractors? Carry this idea to its legitimate conclusion, and half the causes of dispute would disappear.

This brings me to the second division of my paper, viz., a consideration of the necessity of specifications as they are at present drawn.

You will perhaps have gathered from my remarks that I am not in favour of lengthy specifications, and I must confess I think they are drawn out to an unnecessary length, without the least equivalent in the way of further security from bad materials or scamped workmanship. And I now have further to admit my conviction that the specification goes out of its way and out of its true course when it ceases to be anything more than a description of materials. It seems to me that the necessary documents or instruments of a contract should be, first, the plans, elevations, sections, and detail drawings; second, the description of the materials to be used, which of necessity must be a written document, and for convenience is called the specification; third, the conditions of contract, or legal restraints, by which you bind the builder to do the work in accordance with the plans and specification, and also bind the employer to pay for the work done.

To successfully carry out this idea it will follow that the small scale drawings must be prepared with perhaps a little more care and with considerably more detail than they generally are at present. I believe much greater attention is being paid to the small scale drawings than used to be the case, and I know many architects whose drawings are so clear, detailed, and annotated that a specification is almost a superfluity. From this I know it is possible for the thing to be done, and if it were adopted as a system, it would be perfectly easy for the draughtsman to add, either

by writing or graphically, to the general drawings, most of the information which now burdens the specification.

For instance, taking the elevations, why should you not express, once and for all, by printing on the drawings the facings you want, the arches, whether axed or rubbed, the parts of the work in Bath, or Portland, or in both, the parts to be cemented or rough cast, the windows which are to open and which fixed, the glass to be used, and many other things? On the plans, why should you not say what flooring or paving you require, what the hearths are to be, what thresholds, what roof-covering? On the section, the sizes of floor-joists and roof timbers, the descriptions of skirtings? Once on the drawings they are done with, few queries would arise, the surveyor will get through his work quicker, the foreman and clerk of works will not be divided between something on the drawings and a contrary description in the specification.

This all may mean rather more work for the architect at first, but will not the apparent loss of time amply repay him in the end, and certainly save delay on the works? A specification of one hundred pages takes quite a week to write, and even then is by no means a perfect document. Human fallibility enters very much into specification writing, and it is impossible in a written document to notice small errors without a close examination; whereas a drawing can be read, by those who make them, and errors detected literally at a glance. Supposing, instead of devoting a week to writing a specification, you gave that week to finishing up and noting the drawings, what a tremendous difference it would cause. I am sorry to suggest more work to those who, perhaps, are already fairly burdened; but I believe it would be more congenial to the majority to spend the week on the drawings rather than on the dry work of specification writing.

Surveyors do occasionally find a set of drawings with all the sizes of timbers figured on, and what I now plead for is an extension of that principle to almost every detail in the building. To satisfy these conditions a set of drawings would have to include a little more detail work, especially in the sections, and the draughtsman would have to put his section lines where they would show most work, instead of shirking the stairs and the lantern lights, as they often do at present. A plan of the roof timbers would also be desirable, and some of the joinery details should certainly be among the drawings.

Assuming you intended carrying this idea into practice (of putting work on the drawings instead of into the specification), the following, I think, would be the additions:—On the plans: the floors would have the material stated and the thickness; as to how the floors were to be laid and the kind of jointing that would remain in the specification, without a detail showed it. The pavings also would be described, and the hearths, steps, stairs, the direction of the joists and strutting, and the trimmers and trimming joists which might not possibly appear on the sections. On the sections: the skirtings, dado, and picture rails, cornices, architraves, thicknesses of doors—description of plastering, whether cement or lime, also the dados and tile-hangings. On the elevations: the facings, arches, mouldings, rough cast, timbering, tile-work, what windows fixed and which to open, the glass, the external doors, the window sills, steps, and stonework generally. The roof plan would show at a glance which slopes were to be covered with inferior and which with better slating, also the lap, and whether boarding and felt; the roof, whether tile or lead, the flashings and lead flaps, and every other item which at present it takes a few minutes to find in the specification.

This system would save all the difficulty one experiences in trying to locate the position of a certain thing, say a roof slope; you use up all the points of the compass, and you find one part which will not fit in to a concise description. The surveyor takes the slates say of the superior kind, the builder perhaps reads it differently and puts the inferior kind. If the drawing showed by a note or distinctive colouring which was meant, all must read it in the same way.

From the drawings we turn to the specification, as I suggest it should be, and we shall find more than 75 per cent. of its bulk is gone. In the preliminary part all the legal clauses, such as pre-emption, damage, insurance, payment, time, sureties, rates of wages, will all be relegated to the contract. In the excavator and bricklayer all the descriptions of materials will remain in, and the way they are to be mixed and used, but all such items as depths of excavations, thicknesses

of concrete, beds of brick rubbish, thicknesses of walls, mortar, fireproof floors, drains, facing bricks, parts in cement, finishings of internal walls, arches, moulded and gauged work, air bricks; all these would be cut out—as the drawings would show them.

The mason would describe the materials and setting, all other work would appear on the drawings. The slater also would describe the materials and nails to be used. The carpenter would give the usual descriptions as to materials and a general clause about providing all wood, bricks, fillets, slips, and backings.

The joiner would also give the description of materials and method of laying and jointing the floors. Sizes and number of hinges, and prices of locks and furniture (although this could be quite easily put on the details).

The founder and smith would state descriptions of materials and tests, also any ironwork hidden away. All straps and bolts, railings, girders and joists, rain-pipes, and eaves gutters would appear on the drawings.

The external plumbers' work would all appear on the drawings and only the materials specified.

The internal plumber work is a little more difficult to dispose of and until detail-drawings are given for this work, it would have to remain in the specification certainly as regards small pipes and taps.

The plasterer would only describe the materials and the proportions.

All glass would be indicated on the drawings, and therefore the trade would consist of a line or two.

The painter would remain very much as at present.

I have taken a specification of 120 pages, and by cutting out the items which I consider might be fairly described or shown on the drawings, I find it gets reduced to thirty-two pages, which includes some four or five pages for provisional sums and other items for which drawings would not be given.

The reduced specification, which I suggest would be practically a stock document, requiring little if any alteration, except as regards provisional sums, and any alteration it did require would be so slight that an hour would be sufficient to make the alteration. I think this would be a considerable advantage, and the saving of time would be considerable also.

Given a good workable set of drawings, fully noted, with several sections and elevations, and a concise description or specification of the materials to be used in place of the present lengthy one, and I believe good work and little friction would result.

Engineers, to a very large extent, adopt this system with their work, and I have never heard that it suffers, or that it increases their labour.

The third division of my paper will probably meet with some opposition, for I propose in this to abolish the specification entirely when bills of quantities are supplied, and utilise them in its place.

I say that I expect some opposition to this proposal, because I know that there are some difficulties in the way, not the least being that employers know of the specification, and usually expect to see it, whereas bills of quantities to them are unknown. Then again public bodies, such as the Charity Commissioners, require to have the specification submitted to them with the drawings. But these difficulties could probably be overcome by a modified specification such as I suggested just now.

Some architects also do not avail themselves of quantities in obtaining tenders, and to these of course the suggestion would not appeal—others again do not have quantities but have the work measured up at the end. In either case some form of specification would still be required.

But as regards difficulties in combining the bills of quantities and the specification I may point out that in Scotland the specification, apart from the bills of quantities is almost unknown—and, as far as I know, and my experience on this point is not entirely theoretic, no inconvenience is experienced.

Of course usage is, and always has been, a great bar to improvements or alterations of any kind, and the natural conservatism of human nature is not weaker in professional circles than in others, perhaps stronger!

I can imagine some architects objecting to the change because it would give too great a prominence to the quantities, and that it would necessarily result in the quantities becoming a part of the contract; why they should not be I can never understand; the employer pays for them, and they are generally used for the purpose of

settling up accounts. The clerks of works refer to the quantities as much as to the specification when they are allowed a copy; but, of course, they are merely statements of fact and not descriptive, they are not so useful for reference they might be. I know there are many surveyors who would strongly object to the change, as they hold the view that the quantities are only for the purpose of assisting the builder to make his tender; but I combat this theory, for in the bills we have a perfect specification if only descriptions indicating their destination in the work were appended, and if it is possible to use the same as a specification, it would tend probably to economy.

It is perfectly true also that one unacquainted with the arrangement of a bill it is a complex medley of figures and descriptions; but this is caused very much by the system, as in the specifications being rigidly adhered to, and, I am afraid, by a little perversity on the part of some surveyors to increase rather than reduce the complexity. Well, all that would disappear if the specification and bills of quantities were merged in one; we should then have the quantities as a rigid statement of fact with the requisite descriptions of the specification. As I said before, the Scotch schedule of quantities is specification and schedule, and where we have in England references by the builder to what the specification says, in Scotland he refers to what the schedule states. What is possible there should be so here.

Surveyors ought not to object to the proposal, but ought to welcome it, as their work would be brought into greater prominence and into a wider sphere of usefulness than it is at present. If the architect would have it at hand for constant reference, to settle points in connexion with the details; the clerk of works and foreman would also use it, and many extras which are now incurred in ignorance, through the bills of quantities being sealed to them, would be avoided.

A certain class of surveyors I can understand who would object to the change—viz. those who prepare bills of quantities for ridiculously low commission, and to protect themselves against possible errors "amplify" their quantities, so those who add a few rods of brickwork to cover the lack of proper details, or increase the stone work to cover other things, a combined bill of specification would not be acceptable, for the essence of the document would be in its exactness in all parts. I am sure respectable builders would not care for this haphazard quantity system although it frequently gives them more of a thing than they are entitled to; what I require is, that a bill of quantities shall be a representation of the work in the building.

I am prepared to admit that the bills of quantities might be rather longer—that is to say they would be as at present, plus the necessary detailed description of positions in the building, but a saving would be effected in the printing and copying of the specifications, and the extra spent on the bills would be saved in the time usually spent in writing the specification. I do not wish it to be understood that my method would do away with the necessity of detail descriptions on the drawings, but I believe it would relieve many architects, and I dislike specification writing, from a labour which is irksome to them.

How the bills of quantities can be made to answer both purposes I need hardly suggest: those here who do such work; it is a matter of small technical details, and would simply necessitate a careful arrangement of the items, so that each would state its location in the building. Generally I may say that I should group items together, so that you could, by the quantity given and the description, see at once where the work was intended to go.

It would be impossible for me to give even detail this evening, but I have, I hope, given enough to grasp my suggestions. The proposal of adopting a shortened specification is one worth considering, but the latter I consider the more important, and also one which, I believe, will be the system adopted in the future.

Whether I have justified the title of the paper I leave you to judge; at any rate, I have the architect's view in mind all through, although I have advised more work on drawings, I have by suggestions reduced specification writing to a very small part of the work, and also have ventured to suggest the abolition of a document loved by neither architects nor surveyors.

The President then called upon Mr. H. Holloway to read a paper on "Specifications from a Builder's Point of View."

Mr. Holloway prefaced his paper with a

marks. He expressed regret at the absence of Mr. Pinks, and especially at the cause of it, but added that he was bound to compliment Mr. Fletcher on the excellent way in which he had drafted that gentleman's paper. When he (the speaker) wrote his paper he had no idea of the lines that Mr. Pinks was going to take. Had he known Mr. Pinks would be so bold as to take the line he had done, he should have written his own paper on very different lines from those he had allowed. He had had a feeling that architects looked on the work of writing specifications as so much drudgery and work to be avoided if possible, but he had never thought for a moment that anyone would be bold enough to advocate the abolition of specifications altogether. Builders, on their own point of view, had a complaint against architects that they did not give sufficient time, thought, and care, to the writing of specifications. Mr. Pinks, instead of supporting that view, went in an entirely opposite direction—namely, in favour of relieving architects altogether of writing specifications. He thought those present would see many objections to carrying out such a course. Mr. Holloway then read the following paper.

The subject of this paper was suggested to me by your Hon. Secretaries, and at their request I have prepared a few remarks on specifications on a builder's point of view, but at the same time I have endeavoured to avoid airing any personal grievances or propounding any special axioms and crotchets of my own.

I have great pleasure in being here to-night to discuss such an interesting subject, especially as I have the satisfaction of meeting my friend Mr. Pinks in friendly contention, to discuss the matter from two opposite points of view. If there are any hints I may venture to offer, I trust that they may be taken as offered as such, and not in any way condemning architects' specifications or taking upon myself the position of instructor or censor to architects in regard to this very important part of their professional work. You will not therefore expect from me a full and comprehensive specification embracing all subjects, nor my proposals for revolutionising its form and purposes, but rather the terms on which the general idea of a specification should be based, in the hope that it may tend to prevent difficulties and misunderstandings between the architect and the builder.

I should like to take the opportunity of bearing my testimony to the manner in which, taken as a whole, the architects discharge their most difficult and onerous task of dealing with fairness and justice to the contractor, while at the same time acting with loyalty towards their client. During the many years my firm have been in business, we have experienced but two or three instances where there has been a grievance against the architect, and although we wisely insist upon the Arbitration Clause in the Conditions of Contract, we have never yet availed ourselves of its provisions, neither have we had recourse to a court of law, excepting in one instance, and even in that case it was no reflection against the architect, as the point at stake was entirely a question of prices, upon which he had been badly advised by the quantity surveyor.

My first suggestion may appear trivial, but from a builder's point of view it is of some importance, namely:—

The form and arrangement of the specification should be in the simplest phraseology, carefully prepared and legibly written, also set out in clauses, and under proper headings, with margin headings notes, each paragraph being indexed. Remember, it is always essential that the architect's copy should be on the job. The general form is not often blessed with a college education. Don't send the specification copied in tissue or letter-pressed copying paper, which in shreds before it has been on the job a month. In these days of cheap and expeditious printing venture to urge that printed or lithographed copies be supplied.

The conditions of contract should be attached to and form part of the specification. It is not necessary to discuss the form of these conditions, as I presume all architects will loyally adopt that agreed to between the architects' and builders' institutes.

The quantities should be in conformity with the specification, consequently the draft specification should be in the hands of the quantity surveyor before he proceeds with his work; but a little attitude might with advantage be given to the surveyor to vary, or add to, in minor points, in order to bring the drawings, specification, and the quantities in perfect line with each other.

The practice of specifying sub-contractors and

specialists is increasingly resorted to, in some cases almost to the extent of having separate firms for the principal trades. Architects who have had works in the North of England, and adopted the system of employing a separate firm for each trade, know something of the inconveniences of this course of procedure. The practice, generally speaking, increases the cost, causes delay in execution, and creates a considerable amount of friction between all concerned. In cases of special works for which special men are required, such as are not usually engaged by the builder, or in the fixing and arrangement of patented goods which the patentees have to guarantee the efficient working and durability of, it may be desirable to provide for the sub-contractor to completely finish his work. But this custom should be minimised as much as possible, so as to give the builder entire and complete control over the whole of the building in course of erection, as he has to be responsible for everything. In all cases where sub-contractors are engaged by architects there should be an undertaking from the sub-contractor to comply with the conditions of the builder's contract as far as the same are applicable to his work. Unpleasantnesses frequently occur between the builder and sub-contractors through the omission of the architect in insisting upon this point. It is urged by architects that this is a matter between the builder and the sub-contractor, but it is obviously more desirable, and only just to the sub-contractor, that this condition should be agreed upon when the latter prepares his estimate.

Probably the bulk of the builders' difficulties arise from a want of definiteness in the description of the architect's requirements. General "covering" clauses in specifications are much too frequent. If the architect has a difficulty in regard to his working drawings, or in connexion with the site of the proposed building, and is unable to specify precisely what has to be done, he has recourse to his familiar "friend" (the covering clause), and throws all responsibility upon the unfortunate builder. Here is an extract from a specification as a sample of what I mean.

"Do all necessary cutting and making good. Supply all materials and workmanship necessary, although not herein specified, to render the whole of this branch of the trade perfect and complete to the entire satisfaction of the architect."

The same clause, with a little variation, appears after each trade.

Such conditions as these have only to be exposed to be condemned by reasonable men, but unfortunately they appear too frequently in specifications. In cases where it is impossible for the architect to specify clearly and in detail, and for the quantity surveyor to measure, the work to be executed, the proper and just course to adopt, both to the client and the builder, is to provide an amount to be used under the architect's directions and the work paid for either by valuation after completion, or charged for as day work. There is frequently much indefiniteness in the specification with regard to foundations. The builder has to take many risks for which he has very little opportunity of forming any idea as to whether it will involve an expenditure of £1. or 500l. My firm recently tendered for a building where the character of the sub-soil had not been ascertained, to settle the depths of the foundation, consequently a schedule of prices for extra depth of digging and concrete had to accompany the tenders. The prices for the extra digging varied from 18s. to 6s. per yard cubical. The firms tendering were a selected list, and all well-known responsible people. This difficult and unfair position can be easily removed by the architect obtaining the particulars of the soil by means of trial borings, which can be done at a trifling cost.

There should be always a practical reason for what is specified, and nothing should be specified unless the architect thinks it absolutely necessary to carry into actual execution. Also care should be taken not to specify what is a practical impossibility.

The following are a few specimens taken from specifications to illustrate my point, viz.:—
"The excavation to the trenches is to be taken down to a perfectly solid bottom, and the bottom well rammed!" One naturally asks, why ram when you have a natural solid bottom? Is it not possible that if ramming is enforced you will not have a good solid bottom? Supposing the foreman carries out the specification, digs the trench to the depth shown in drawings, and has the bottom well rammed for the architect's inspection, it is possible the architect may be deceived by the sound appearance of the bottom

and have the concrete put in upon what is anything but a natural sound foundation.

"The concrete in trenches to be well rammed." The absurdity of this description is obvious. To ram concrete immediately it is thrown into the trench in a soft condition is quite useless and a waste of labour, and if rammed after it has commenced to set, it would only tend to prevent its adhesion.

"The stock bricks are to be hard, well burnt, perfectly square, and of uniform colour." It is only necessary to visit a brickfield, and see the making of stock bricks to know the impracticability of this description. The description is quite contradictory to the nature of stock bricks, which are burnt in large stacks, or clamps of about half a million each, with fuel sprinkled between to help the firing. The bricks the get the strongest heat will be the hardest, and as a matter of course, to an extent flared and varied in colour. The weight of such a large quantity stacked together before being burnt must of necessity press the bricks somewhat out of square. The beauty of stock-brick facing to my mind is the slight variation of colour.

"The mortar to be composed of one portion grey stone lime to two portions of clean sharp sand." Either the proportion specified is not expected by the architect, or he must be ignorant of the proper proportions of lime and sand for good mortar. There is no strength in the lime of itself. The proportion of one of lime to four of good clean sand makes the best mortar.

Particular quarries for stone are frequently specified (especially Yorkshire stone), which have been worked out for several years. It is desirable, as far as possible, to avoid the mention of particular quarries, unless the clause is modified by the addition of the following:—

"Or stone from some other quarry equal in quality to that specified."

Perhaps the most difficult part of an architect's specification is that in reference to timber, and the builder finds it more trouble than all the other kinds of material combined. The architect generally makes certain ground for himself by specifying that it is to be "perfectly free from sap, large knots, shakes, and all other defects." Such a description is very admirable if the material can be so supplied, but it is perfectly well-known that this degree of excellency cannot be maintained, hence the difficulty of interpreting to what extent sap, knots, and shakes will be tolerated. Unfortunately the opinion of clerks of works (to whom this is usually referred) varies very considerably according to their knowledge, or other contingent circumstances. It is a mistake to suppose that because there is a slight discolouration on the edge of the timber it is unfit for use. Care should be taken to see that no sappy wood is built into a wall, or fixed in a confined position where there is no air space; but for open roofs, floor-joists, and such like, the timber will not rot or become weakened because of a little blue sap, which is frequently only surface decay. I have been asked by architects to suggest a suitable and reasonable description for timber and joiners' deals, but have always found it a difficult task to do so. Specifying by means of names of ports and brands is unreliable, as the goods scarcely ever maintain the same quality for two or three seasons together. For a few years a splendid quality of joiners' deals had been imported from the Archangel Port, but last year it was much below the average, and a large proportion of it quite unfit for good-class joiners' work. With considerable diffidence I venture therefore to suggest the following as a reasonable description for timber and joinery deals, viz.:—

For the Best Class of Work.—"The Memel or Dantzig timber of the best selected middling quality."

For Ordinary Class of Work.—"The Memel or Dantzig timber of the good middling quality; or (where scantlings under eleven inch wide, and four inch thick), from sawn scantlings of an approved Swedish or Russian port, not inferior to a recognised good fourth quality Swedish brand, or third quality Russian hammer brand."

"All timber to be free from large and loose knots and shakes, also practically free from sap to the architect's approval."

For Joiners' Deals.—"Good quality, from approved Swedish or Russian ports, free from large and dead knots, shakes, and sap. Not inferior to a recognised first and second quality Swedish brand, or second quality Russian hammer brand."

Pitch pine, and Oregon pine is much used for timber work, also yellow pine for cabinet work, but neither of these American woods is suitable for positions exposed to weather and damp. But

for interior work it is much cleaner in appearance than the Swedish and Russian goods.

A point requiring the special consideration of an architect in preparing his specification is that of fixing the time to be allowed for the execution of the work, particular regard being given to the period of the year at which the building is to be completed. It frequently happens that a job, say of a new house, or an addition to a house, to the value of 2,000*l.* to 3,000*l.* containing a quantity of good joiners' work is commenced in July or August, and has to be completed by the Christmas following. The specification insists that the joinery work must be of thoroughly seasoned wood, roughly framed together, and put into drying room within a month after signing the contract. (By-the-by, notwithstanding the stipulations, it too frequently happens, that the details are not supplied until after the roof is on.) A moment's thought must satisfy anyone with practical knowledge that to put good seasoned joinery into a building erected under such conditions, simply means ruination to the work, and ultimately serious trouble and expense in easing doors and windows, stopping open joints, touching up shrinkages, &c. Moreover, the builder is condemned for supplying inferior material. In all cases where good plastering and joinery is required, architects should make arrangements to avoid either of the same being proceeded with to any great extent on the building during the winter months.

In conclusion, I would urge that in order to avoid friction, disputes, and to secure good work, there must be mutual confidence between the architect and builder. To secure this the architect should only invite to tender (where competition is required) those with whom he can take counsel and place confidence. There is far too much suspicion, especially on the part of the younger members of the profession. I do not deny there may have been reasons for it, but, speaking generally, builders have a regard for their reputation. They know that one act of rascality exposed means ultimate ostracism. On the other hand, a good sound building is a standing advertisement. Many little misunderstandings and difficulties would be obviated if there was more personal intercourse between architect and builder, especially upon the building. This course has been adopted with most of the architects with whom my firm have done business for any length of time. With these gentlemen we have never experienced the slightest trouble, in complying with their requirements and giving every satisfaction.

The lot of a builder in these times of keen competition, unreasonable demands on the part of workmen, fluctuations of trade, losses by stress of weather, and the exceptional worry arising from what is probably the most uncertain and risky commercial undertaking in the country, is by no means an enviable one. I therefore appeal to you to have some regard to the peculiar difficulties with which the builders have to contend, and urge you to do your part in promoting a good understanding and mutual confidence between the profession and the trade. I can assure you, on behalf of those whom I have the honour to represent, that such good feeling and confidence will be heartily appreciated and reciprocated.

The President having invited discussion:—

Mr. Fleetwood said that the two interesting papers that had been read contained many valuable suggestions. He fully agreed with all that Mr. Holloway had said. With regard to Mr. Pinks' paper he regretted that it was not accompanied by his ideal specification and drawings. The drawings would certainly have needed the aid of a magnifying glass, and it would have been interesting to see one that had been on a building for six months, after they had been constantly handled by the clerk of the works and the foremen of the various trades, and had been to the top of the roof in a shower of rain, &c. He was afraid that all the information on an eighth-scale drawing would have been obliterated long before the roof was on. He did not think the suggestion was quite practicable. Some architects made drawings for all parts of the building, on an inch or a half-inch scale, and it was quite possible that a lot of information could be put on those, but their number might run into hundreds, and it would be far more difficult to obtain the required information from them than by looking at the specification. A specification should have a very full and ample index, and when it had that, there should be little difficulty

in finding what was wanted. As regarded the order in which specifications should be written, there were advantages in departing from the trades. In the case of alterations, undoubtedly the specification should be written in the order in which the work was done. The order of the trades might be modified to a certain extent, and many things might be grouped. For pavings, for instance, all the concrete, cement, tiles, &c., might be put together instead of being scattered through the several trades. At the same time, he thought it would be difficult to depart from the general order of trades. There were certain stock clauses which had appeared in specifications for generations the meaning of which was doubtful. It would, in his opinion, be well if they could be done away with to a large extent. On the other hand, it was almost better to put in a stock clause than a description of something which could not be done, and which was altogether impracticable.

Mr. Woodthorpe agreed with a good deal that Mr. Pinks had written—certainly as to putting as much as possible on the drawing, although often there might be as many as 100 or 200, as Mr. Fleetwood had said. In the country a builder depended a great deal more on the drawings than on the specifications, and he personally found it much easier to see that work was carried out in a proper way, if the item appeared on the drawings, than if he had to wade through a specification of, say, 130 pages in length. Even if a lengthy specification were well indexed by one man, another man experienced much difficulty in finding, on the spur of the moment, a good many items to which he wanted to turn. The more drawings they had, and particularly the more sections, the easier it was to get the sections right. In cases where they had small builders to deal with in the country, it was of the greatest assistance to them to give them as many large detailed drawings as possible. A great many men used eighth-scale drawings, upon which it was easy to get a considerable amount of detail; but, of course, on quarter-scale drawings they could get a much greater amount. In the case of alterations, this course saved a very great deal of trouble. Of course, they would be saved much trouble if they could do without a specification, but he did not think they could possibly do that, unless they delegated a great part of their work to the quantity surveyor, in which case he felt certain they would never get what they wanted. Mr. Holloway had said that architects and builders should loyally agree to carry out the conditions of contract, but he (the speaker) was sorry to say they had never been able to get the conditions of contract. He had been on the Standing Committee of the Institute for some years, and they had never been able to get conditions settled with the builders which would be of any use at all. He hoped the Institute would soon adopt conditions of their own, and get them printed, so that the matter might be settled. In specifications the general covering clauses should be done away with as far as possible. It was much better, even in a specification of alterations, to describe exactly what one wanted, as far as one was able, and then no difference would be likely to arise between the builder and architect. How builders could really make estimates on some general specifications he failed to see. In such a case it generally resulted that the man who got the job could not carry it out at a profit if the architect were at all strict, and if he were not strict, he was in the awkward position of not doing his duty by his client. He would suggest that there was a very good opening for a young man who was going in for the subject to write a handy little book upon it, for he did not think that a really good one was to be obtained anywhere. Mr. Woodthorpe concluded by moving a vote of thanks to Mr. Pinks and Mr. Holloway.

Mr. F. Hooper seconded the motion, adding that he would like to include Mr. Fletcher's name for his kindness in reading Mr. Pinks' paper. The function of the specification was, he went on to say, to secure a clear understanding between three parties—the employer or client, the architect, and the builder. It must be recognised that it was not only the builder who might try to evade the specification. He had heard builders complaining bitterly of the way their specifications were interpreted, and he believed, with some justice. If architects were to have that intercourse with builders that Mr. Holloway suggested, he was of opinion that these matters of right understanding would be more easily arrived at. He was interested to hear from a builder that the cost of work often depended upon who was selected as

clerk of the works. He believed it was also the case with architects. Some architects were much more strict than others, and would have the work carried out according to their specifications, and tenders were affected accordingly. And, again, novices whose specification could not be easily understood, and whose drawings were vague might also expect to get high tenders. Simplicity should be their aim, and to write an illegible specification seemed to him very cruel. Indexing and side headings were useful, and it was a great convenience to builders to have the matter type-written. The speaker deprecated the use of the word "properly," in describing the manner in which work should be done, holding that it was extremely vague, and that it created an excuse for all sorts of disputes.

Mr. H. W. Pratt considered Mr. Pinks had taken a very bold course in advocating the abolition of specifications. Had that gentleman suggested that the quantity surveyor should write the specification he should not have been at all surprised, although it was true Mr. Pinks seemed to think that architects, builders, and quantity surveyors hated them. Why the work should be such a drudgery he could not see. His own idea was that those who spoke most of the irksomeness and drudgery of it were those who knew least how and what to describe. It appeared to him unnecessary that specifications should be written in great detail, and he thought they owed it to quantity surveyors more than anybody else that they were often so written. He objected altogether to quantity surveyors writing architects' specifications—architects should write them themselves. Mr. Pinks' idea of a drawing being a specification also was a very good one to a limited extent, but it would be impracticable to put all the notes on an eighth-scale drawing, and however much they might take care of a drawing on the building, those notes would certainly be more or less obliterated before the job was half finished. To put scantlings, timbers on a drawing was a good idea, but to put on descriptions of plaster work and finishing and a host of things like that was quite out of the question. It would be quite as easy to get all those details from the specification as from the drawing. He was in favour of an abridged specification, and putting as much as they reasonably could on the drawing. If the specifications were abolished the quantities would have to be the specification quite as much as the drawing, and they would accordingly be half as long again as under ordinary circumstances, while the whole matter would be so split up that he did not think it would be acceptable to anybody. As to the differences between drawings and specifications which Mr. Pinks alluded to, he (the speaker) was of opinion that there should be none. The two should agree, and if they did not it was sheer carelessness. He did not concur in the remarks of the last speaker that typewriting should be adopted for specifications, because several copies of one document were often required, and blunders were so frequently made by typists in copying the figures.

Mr. C. H. Brodie was of opinion that Mr. Pinks's paper was full of fallacies. That gentleman said specifications were a great deal too long. He (Mr. Brodie) was bound to say that quantity surveyors' specifications were often a great deal too long, but he had never had a complaint brought against a practical architect's specification. He did not know what sort of building Mr. Pinks took a hundred pages to describe. Having urged that specifications should be carefully tabulated, Mr. Brodie said the question had been asked, "Which was the more important, the drawing or the specification?" They were one and the same to him; he did not see how one could be more important than the other. Another of Mr. Pinks' points was that the drawing should state what windows should be open and which fixed. He had seen a good many drawings, and most of them showed this—they certainly would not look at a specification to see that. The speaker alluded to other contentions of Mr. Pinks's as to details which should be shown on drawings pointing out that it was the common practice to proceed on the lines suggested. Adverting to Mr. Holloway's paper, he expressed pleasure that the gentleman had dealt with the question of timber, and he advised those who had not had much experience in the selection of timber to apply to a merchant for a table showing the imported sizes. They would then not fill up their specification with perfectly absurd sizes which would be very expensive. Reverting to Mr. Pinks's paper, he contended that it would be impossible to abolish specifications, for all the points that needed atten-

ion where alterations were being carried out could not possibly be shown on a drawing. He described type-written specifications as a perfect error, favouring the process of lithography where several copies were required. In conclusion, he earnestly appealed to Mr. Holloway and those associated with him to get settled those conditions of contract which had been shilly-shallying about for so long between the Institute of Architects and the Institute of Builders. He was of opinion that the insertion in contracts of conditions thus adopted would save many builders having to refer to solicitors contracts with architects for whom they had not previously worked. Much valuable time would thus be saved.

Mr. J. C. Stockdale said his idea was that Mr. Pinks, in referring to specifications of 150 pages in length, had created a giant for the purpose of laying him afterwards. He personally had seldom seen a specification which exceeded thirty or forty pages, and had never known a lawsuit follow on the use of a specification of that length, nor could he remember any arbitration in connexion with one. It was quite possible to carry out work with a specification of ordinary dimensions. Mr. Pinks spoke of specifications and drawings not agreeing; that would be more likely to occur where a quantity surveyor wrote the specification; there was only one person who knew what he wanted, and that was the architect who had the work in hand. As to quantities being made part of the contract, he did not see why they should not be, because frequently they were the basis for settling variations at the end of the job. Mr. Holloway alluded to the covering clause, but unless the specification was made of an inordinate length they could not well avoid putting that in—they could not specify everything. Concerning timber, Mr. Holloway had said that a little sap-wood might be permitted; he (Mr. Stockdale) thought a great deal rested on definitions, and what the builder considered "a little," the architect might think a good deal; the safer plan was for the architect to specify "no sap-wood," he could then use his discretion about passing any when the work was proceeding.

Mr. Simpson said he was glad, for Mr. Pinks' sake, that he was not present, as he had been so emphatically set upon. He mentioned a case which was proceeding at Birmingham, in which the specification had been done without, the quantities being referred to for a description of the building. The quantities did not state where the different sorts of facing were to go, and litigation as the result.

Mr. Max Clarke said that upon one occasion he wrote a specification on a drawing. It was not legible, but it took far more time than would have to be expended on an ordinary specification, and it looked extremely ugly. That one effort of his taught him that such a course was entirely unsatisfactory. As to the length of a specification they might have one which was quite moderate—130 pages, and one which was immoderate—30 pages. There were specifications and specifications. They depended entirely on the building. For a 20,000l. job, a 20-page specification would not exactly answer. He believed he was right in saying Mr. Pinks had had some connexion with people in Scotland. Scotch bills of quantities were very lengthy documents, prepared on a very different principle from that adopted in London, but in very few instances did they give the position of the materials; so if they referred again to the 20,000l. job, the bill of quantities would have to be 500 or 600 pages long to combine specification and quantities, and several lithographed copies of it would cost more than the architect's commission. The only occasion on which he had heard the word "proper" used was in connexion with door-frames and window-frames, and he believed there was an acknowledged section which was a proper door-frame, as also with a window-frame. It was important that the conditions of contract should be settled without delay, and he hoped pressure could be brought to bear upon the parties who were holding back. The speaker urged that all their arrangements with contractors should be in writing, and that typewriting for specifications was very dangerous, as the operators sometimes left out whole paragraphs.

The President said he understood there was a member of the firm of Messrs. Simpson & Co. present. Perhaps he would take part in the discussion.

Mr. Lough, responding to the invitation, suggested that the members should winnow the chaff from the wheat in both papers—even in Mr. Pinks' there were some valuable suggestions. They placed all their details on the drawings,

he thought architects would have to adopt larger drawings than at present, and the number of sections would have to be multiplied by six. In his opinion, builders had a slight grievance owing to the length of specifications, in many instances, and architects could very well specify on the drawings a great deal of what they wanted done. If that were done, a short concise specification would be the result. He was with Mr. Holloway in every item except that he did not see the necessity of attaching conditions to every specification. The more architects and builders got together the better it would be for themselves and their work.

The President said he was prepared to defend Mr. Pinks' paper in the absence of that gentleman. He was bound to say he saw nothing in the paper to object to, and a great deal of the criticism upon it arose from the fact of it not having been sufficiently carefully listened to. Mr. Stockdale showed the cloven hoof when he said "You cannot specify everything," and so you might be able to "do all your specifying in about thirty pages." But if they specified anything they ought to specify everything, and then they could not confine themselves to thirty pages. The length of specifications was quite a comparative thing. They might be able to specify the whole work of a 20,000l. warehouse in twenty pages, and it might take a hundred pages to specify for a 3,000l. house. It depended on the quality rather than the quantity of work to be done, and the variety of the detail. For a building with twenty-five or thirty different sorts of doors, twelve or fifteen different sorts of pavement, and twelve or fifteen different sorts of glazing, they could not do with less than one hundred pages. It was his custom to make as many notes on the drawing as he possibly could—that course saved both the builder and themselves a lot of time. It was true that Mr. Pinks had had a good deal to do with Scotch work, and no doubt that accounted for several of the opinions he had offered. To do away with a specification altogether was a very bold suggestion, and one he should not care to fall in with, because no matter how carefully the quantity surveyor took out his quantities, and how carefully the architect figured and noted the drawings, there must be many things that could only be properly said in a specification. The President deprecated the use of books by a young architect for the purpose of helping them to write a specification. He should find out by experience what he wanted, and it was the fact that he did not know what he was specifying that led to the general clauses that had been referred to. He had hoped to hear more than he had done as to how far an architect ought to go into trade terms. He had recently specified "best picked stocks" for facing, but the bricks used were not good enough to satisfy him, and he was then told that he ought to have specified "shippers," which were the best kind of stocks. Mr. Pinks said that in some cases they needed to put "extra super best" when they wanted the best, but he (the President) thought an architect might put at the beginning of a specification that when he said best he meant it. With regard to what Mr. Holloway had said on the subject, he considered it impossible for any man to have a sufficient knowledge of timber to specify exactly what he wanted. Sizes of timber were constantly varying.

The vote of thanks was heartily accorded.

Mr. Holloway, in reply, said that if he had brought out any useful hints he was quite satisfied. Although he totally disagreed with Mr. Pinks in one or two of his arguments, he thought that gentleman had not been treated with quite that justice which he deserved, some of his suggestions being well worth considering. When, however, Mr. Pinks argued that a builder did not know much about drawings, he was arguing against himself, for the builder would be more confused if all the details which should be mentioned in a specification were added to the drawing. Mr. Pinks' whole aim seemed to be to underrate the specification. He (the speaker) on the other hand wanted to raise it to a higher level. It should be quite equal in importance to the drawings themselves. He had been under the impression that conditions of contract had at last been settled, but he heard with regret that this was not so. From the point of view of the builders, the architects were a bit pig-headed about the matter. He trusted that when the conditions were finally agreed upon the architects would loyally adopt them in all contracts. He advised young architects to get practical experience by spending a fair amount of time upon buildings while in course of erection,

and referring to the course of preparation of specifications, he mentioned that he preferred them in ordinary writing to typewriting. Mr. Holloway impressed upon architects the importance of only specifying materials which could be obtained and work which it was possible to do; and on the question of timber he pointed out that a little sap on timber so long as it was exposed to the air did not cause it to rot as many clerks of works thought it did; they must, however, use discretion in avoiding the use of timber with sap under certain conditions.

The proceedings then terminated.

THE ARCHITECTURAL ASSOCIATION SPRING VISITS:

ST. PETER'S CHURCH, EALING.

THE sixth spring visit was paid on Saturday last to St. Peter's Church, Ealing, the late J. D. Sedding and Mr. H. Wilson, architects. The party were met by the Vicar, the Rev. W. Petty, who conducted the members over the church, thereby adding largely to the interest of the visit. The church has been illustrated by us,* and is well known as one of Sedding's latest efforts.

Internally, the striking features are the three widely-spaced piers of the nave, to which is attached a semi-circular shaft, which is carried up and supports a tie-beam. These nave piers are connected by flat segmental arches springing from the side of the piers and supporting the triforium arcade. The tower will eventually occupy the north transept, the nave piers being strengthened to carry it. On the north side of the west entrance formed by the setting back of the great window occupying the west front is the baptistery, the corresponding recess south of the entrance being used as a waiting space. The southern of the two oblong towers which flank the west window is used as a staircase to the triforium, which serves as a gallery to be used on special occasions. The sacristy and clergy vestry form the north choir aisle, over which is the organ-gallery. On the south of the choir will eventually be placed a larger vestry, connected with the northern one by means of a passage under the great east window.

The choir is paved with Irish marbles, and is well raised above the nave, from which it is divided by a low wall of Box Ground stone banded with Devonshire soap-stone, a kind of serpentine not polished, but simply oiled. The roof, which is continuous over the nave and aisles in one slope, is treated, as far as the nave is concerned, as a simple collar-beam type, with the addition of extra struts, forming a semi-octagonal outline, and coloured in two shades of blue. A tie-beam is carried across, supported by the pier-shafts, where these occur. The lower part of the nave piers are panelled in wood, and coloured a bright blue. The seating is effected by fixed seats of simple design in the nave, stained dark green and French-polished. The aisles have chair-seats. The western and northern doors are solidly framed, and covered with light brown leather, and faced at intervals with brass worked with flowing patterns. The bronze figure of an angel, which occurs in the centre of the west door, is by Mr. Pomeroy. A striking feature in the interior is the absence of the stock Gothic mouldings, and the use of bold broad splays in their place. Externally, the church is constructed of yellow stock bricks, Box Ground stone being used as a facing for the more important parts. The main roof is covered with grey slates.

The west front, with its immense window of flowing tracery, flanked by the solid-looking towers, is characteristic of the late J. D. Sedding's work.

The feature of the main roof is that the piers to the nave are carried through it and covered with ogee copper roofs. Between these the line of the triforium shafts are carried through, and will eventually be crowned by statues. All these piers are connected just above the roof-level by flat segmental arches, which help to break the lines of the great single-span roof, covering nave and aisles. There are no clerestory lights in consequence, but abundant light is obtained from the great west window, of the Sloane-square type, and from a continuous range of lofty aisle windows.

After thanking the Vicar for his courtesy in being present, the party, at the invitation of Mr. Shuffrey, proceeded a short distance to inspect his house; charmingly fitted up by himself, and perfect in all the internal arrangements. Tea was

* See the *Builder*, November 16, 1889.

then provided for the members by Mr. Shuffrey, bringing to a close an instructive and enjoyable afternoon.

THE BRISTOL HIGH CROSS, STOURHEAD, WILTS.

THIS beautiful and interesting structure was first erected in 1373, at the intersection of the four principal streets of Bristol (where a former



Old Bristol High Cross, set up at Stourhead.

"High Cross" stood, as mentioned in a MS. calendar of 1247), to commemorate the separation of Bristol from Gloucester by a Charter granted to the burgesses by Edward III. It then probably consisted of a lower open stage with angle-shafts and a central core, with groined canopy supporting a base of tabernacle-work, with corbels for the erect figures of former royal benefactors to the city. Pooley, in his "Crosses of Gloucestershire," 1868 (his information is apparently gleaned from Barrett's "History of Bristol," 1789), describes these effigies as—on the north, John (facing Broad-street), on the east, Henry III. (Wine-street), on the south, Edward IV. (High-street), and on the west, Edward III. (Corn-street); and states "that of Edward IV. was added, afterwards, to the other three figures," but it seems improbable that the Cross would have been left with only three figures, and it is more reasonable to suppose that this represents some other King (possibly Edward I. These figures were divided by the angle shafts, and were surmounted by traceried canopies, the whole terminating in a shaft with a canopied head containing either two or four sculptured subjects. As in the case of most other crosses, the latter portion was doubtless destroyed in the religious troubles of the sixteenth century.

In 1633, repairs being found necessary, very important additions were made to the Cross, at a cost of 207*l.*, consisting of another tier of effigies with canopies, then a stage of heraldic shields with cherub supporters, also under canopies, and a crocketed spirelet, thus raising the height of the structure to 50 ft. The addition was made with great judgment as to proportion, and it is interesting to compare the Carolian Gothic work (intermixed as it is with contemporary ornament) with the beautiful detail of the original. The effigies were seated, and represent later Royal personages, who had either granted or confirmed charters, viz., Henry VI. (eastward), Elizabeth (westward), James I. (southward), and Charles I. (northward). The structure was further enriched by colour and gilding, and this was repeated in 1697.

In 1733 it was removed as a "dangerous erection," at the instance of a silversmith living near, and its stones thrown by in the Guildhall, whence it was rescued and re-erected on College Green shortly after.

But in 1763 the Cross, by "interrupting gentlemen and ladies from walking eight or ten abreast" (Barrett's "Bristol," 1789), again gave offence, and was finally taken down, the stones being afterwards given to Mr. Henry Hoare, of Stourhead, who erected them in his park (in 1766) at a cost of 300*l.*, adding a large core of masonry in the place of the central shaft of the lower stage for greater stability, and surmounting the whole by a cross of copper. The wide reputation of his son, Sir Richard Colt Hoare (to whom this work is generally attributed), has overshadowed the very manifest antiquarian tastes and capabilities of Mr. Henry Hoare as evinced in this and the similar work of removing to Stourhead, in 1765, the building known as St. Peter's Pump from the south-west corner of Peter-street, Bristol (where in 1633 it superseded the ancient openwork cross erected by Spencer, Mayor of Bristol, in 1474). This he erected on a site about a mile higher up the valley, at the extreme source of the River Stour. It is not recorded how these two relics came to be presented to Mr. Hoare; the fact proves that his influence at Bristol was considerable.

Unfortunately, in his zeal to make his rebuilding of the cross complete, Mr. Hoare made the great mistake of using iron for dowels, cramps, and tie-rods—a central rod of iron being carried through the spirelet and the core of the upper stage. This has had the most disastrous results—the stone being split and fractured in all directions, and this, with other injuries caused by the fall of a tree in recent times, rendered the condition of the structure most critical when the present baronet, Sir Henry H. A. Hoare, succeeded to the estate in July, 1894. One of his first acts of ownership was to consult Mr. C. E. Ponting, architect, of Marlborough, under whose care extensive repairs have now been carried out in a thoroughly conservative spirit, no old stone which could in any way be retained has been removed, and all new stones carefully copied from the parts which were lost. The surface of the old work has been in no instance cleaned or in any way altered.

The work has been carried out by Messrs. Harry Hems & Sons, of Exeter, with the result of placing the Cross in a perfectly secure state. The following inscription has been placed on the

base to commemorate the various epochs in the history of the cross:—

The Bristol High Cross.

Erected in High street, Bristol, 1373.
Restored and one stage added, 1633.
Taken down in 1733, and shortly afterward erected on College Green, Bristol.
Again taken down in 1763.
Given to Henry Hoare, Esq., of Stourhead, whom it was removed and erected here, 1766.
Restored by Sir Henry Hugh Arthur Hoare, 6th Baronet, 1895, it having then fallen into a most dangerous condition.

SOME FURTHER NOTES AT THE BUILDING EXHIBITION.

CONTINUING our notes of the fitting arrangement of buildings from last week, we may note that the Fireproof Construction Company, part of whose exhibit we noted last week, claim that their hygienic cement partitions, of hollow form, are one-fifth of the weight of 4½-in. brickwork, and that, by the interlocking system of construction, they are rendered perfectly self-supporting, which we should consider very probable, seeing that the whole partition is bound together to form one solid mass; this renders it useful, as it dispenses with the need of an iron joist. The system has been found to be sound proof, and has been used in cubicles in music-schools for this purpose. Other exhibits of the company are the fireproof hygienic effluence-cement, whose special quality is quick drying and freedom from acid.

The "Sheepwood" patents for the protection of iron-work from fire are worthy of inspection. The system can be applied to partitions and floors. In the partitions, they do not vary much from the other hollow concrete structures described, one feature being that the hollow space is continuous vertically. The Sheepwood floor consists of arched tiles formed to fit round the flanges of the joists.

Mr. Wiseman exhibited several improvements in door and window-fasteners. One of these admits of the sash-windows being allowed to remain open, while at the same time being locked. The "Reliance" Door-Stay, by the same exhibitor, is practically a substitute for a door-chain, which it is an improvement. The "Reliance" Picture-Hanger consists of a long double-joint rod, which, by means of a screw-joint, can be lengthened at will. It is an improvement on the use of picture-cord or wire for this purpose, and is in itself not unsightly.

The Expanded Metal Company had a special position to show the several applications to which this useful material can be put. Its principal qualities are that it is light, strong, and rigid; forms an excellent key; will bend to any shape or position; is useful as a backing for cornice and, when galvanised, forms a good and cheap window-guard for churches, &c. Its wonderful adaptability for every purpose in which wire-lathing was formerly used is its chief merit.

The Incandescent Gas Co. had a good display of their important invention. Their new form of burner has already been alluded to by us some time since.

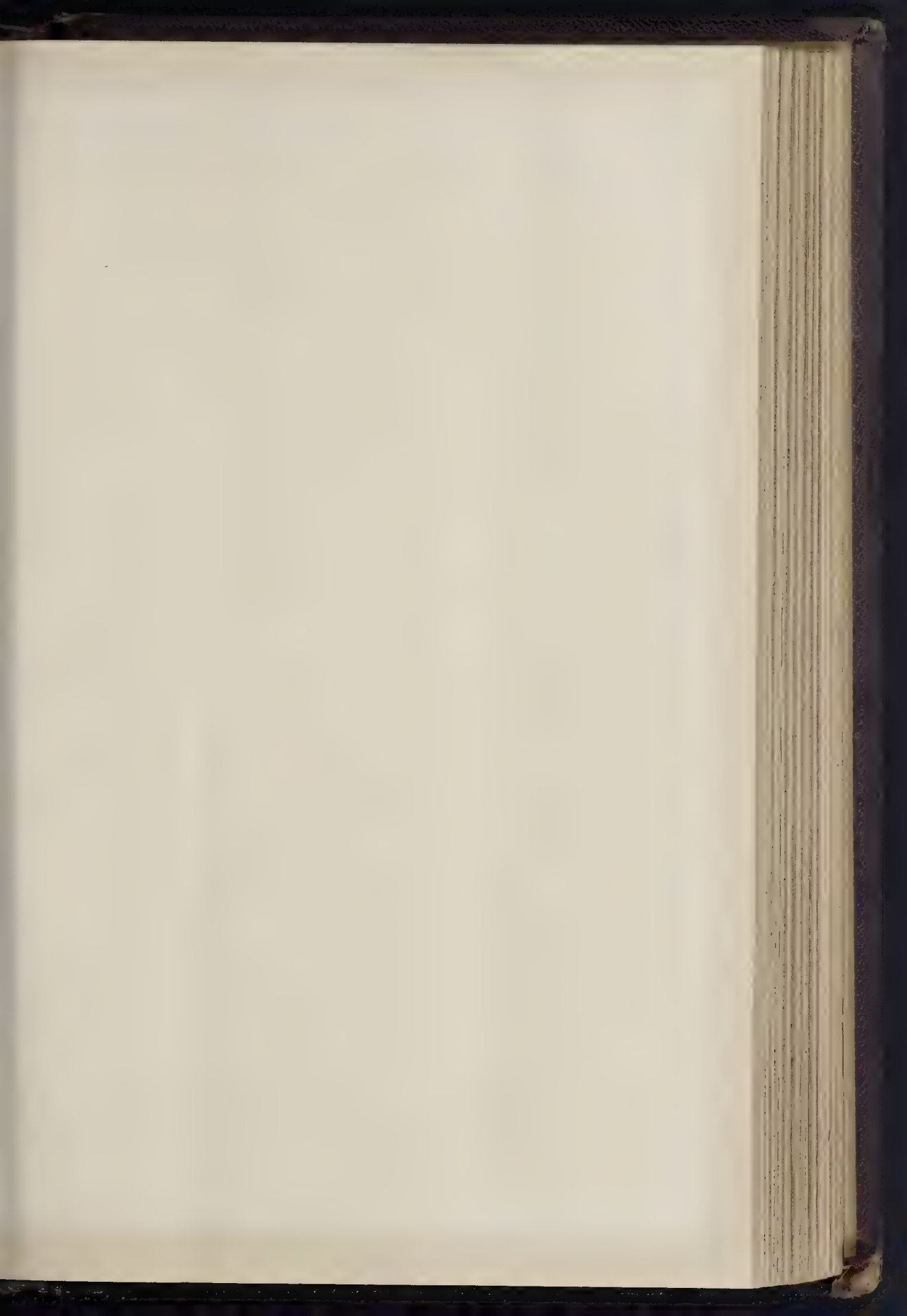
The by-pass which is now exhibited is a distinct improvement, as it not only saves the "mantle," but the burner is visible, when turned down, on entering the room. The "Surplus" pendant, which allows the gaselier to hang at any height or angle, is an ingenious contrivance. The "mantles" can now be fitted by any person; this invention should have a future.

Parham's "Perfection" Glazing is a system of patent glazing with wood bars and springs somewhat similar to the patent iron systems.

Messrs. King & Smith's "Honeycomb" window bin should be noted by architects. It consists of hollow terra-cotta tubes, hexagonal external, into these the bottle is placed. They compare favourably with iron wine-bins, and are clean and easily fixed.

Messrs. Anderson, of Belfast, exhibit the felt and silicate cottons, which are of use as sound-densers, &c. The patent hair-fabric, winding round water-pipes against external water, is a useful material, and easy in application.

Callender's Bitumen Co., Limited, show their pure bitumen damp-course and bitumen sheet. This sheeting is made in various widths for wall and in long lengths, and the lapped ends become hermetically sealed by the pressure of brickwork. The price compares favourably with the lead asphalt damp courses. It has been used throughout the Tower Bridge and other large works, and is recommended by some of the leading engineers. Machinery.—Although it cannot be said to





THE ABBEYS OF GREAT BRITAIN

DRAWN



MR. P. P. 1895. SPRAU & CO. 48 & 50 EAST HARING STREET FETTER LANE E.C.

1. NETLEY, LOOKING EAST.

ALLOWS

The makers of machinery availed themselves very largely of the opportunities offered by the Building Trades Exhibition, to bring before the public any novelties in their several specialties, and, taken as a whole, the Agricultural Hall contained much that is worthy of the attention of those engaged in many of the more important industries of the country. The exhibition of wood-working machinery by Messrs. J. Sagar & Co. (Halifax, Yorks) included machines for planing, cross-cutting, &c., and for many other purposes of a similar nature. Their planing-machine, which planes the top surface and both edges at one operation, will recommend itself to those using such tools, since besides being capable of dealing with work from $\frac{1}{8}$ in. to 5 in. thick, and 24 in. in width, it embodies several recent improvements of importance. This firm also show band-sawing machines with 30-in. saw-ullies, and a circular saw-bench of improved pattern, with rising and falling table suitable for saws up to 18 in. diameter.

Spear's "Expert" chain mortising machines, shown in another part of the Hall (Bay No. 14), so require to be specially mentioned, and the specimens of the work these are capable of performing show that there is now but little room for improvement in this class of machinery.

The makers of gas-engines, although, perhaps, not so numerous as formerly, were nevertheless well represented. Among these Messrs. Crossley & Sons (Manchester) exhibited an engine of 14 h.-p. nominal, capable of indicating 40 h.-p., and giving a brake of 33 at a speed of 170 revolutions per minute. This engine was used for driving the brickmaking machinery of adjacent exhibitors. An engine of 7 h.-p. nominal, giving a brake of 13 h.-p. 180 revolutions per minute, and another of 1 h.-p. nominal, giving a brake h.-p. of 6 at 200 revolutions per minute, were also shown of this firm; both of these contain several recent improvements. Gas-engines on the "Otto" principle were shown by Messrs. Tangy, Birmingham, and this firm's exhibit of lifting apparatus, such as hydraulic jacks, rope and chain blocks, and various other gear necessary for building work, was also important, since this class of work is one of their specialties, and its value can hardly be overrated when the safety of the men employed in building operations, combined with expedition, are sufficiently considered. Such appliances are, however, very well shown by the Pickering Lock and Hoist Company, Clerkenwell, who exhibited various patent pulley blocks, quick sack hoists, warehouse hoists, and other similar apparatus, capable of dealing with moderate weights.

As a contrast to this light class of machinery a powerful brick-making machine shown by Messrs. (Stroud) may be mentioned. The clay used in this machine in a stream which is cut into bricks by an automatic cutting-machine capable of cutting from 4,000 to 5,000 per hour.

Among others of a like nature, the machines exhibited by Messrs. Pullan & Mann (Leeds), and those by Messrs. T. Middleton & Co. (Southwark), should be especially mentioned.

No doubt both engineers and architects will have found most interest in examining the cementing machines, and the specimens shown by Messrs. H. Fajia & Co. (Westminster), and the samples of tested products used in building shown by Messrs. Kirkaldy & Sons (Southwark). These are all shown for the first time in connexion with the Building Trades Exhibition, but their value is now so fully demonstrated that it is to be hoped similar exhibits will always be included in the future.

BUILDING TRADES EXHIBITION.—By a press for which escaped our notice the name of Messrs. W. Harriman & Co., of Newcastle-on-Tyne, was incorrectly printed in our last as "W. Harrison & Co.," in our reference to their exhibit.

CARPENTERS' HALL LECTURES:

WORKS OF THE MANCHESTER SHIP CANAL.

The fourth of the recent series of lectures given at Carpenters' Hall was delivered on Wednesday, the 27th ult., by Sir E. Leader Williams, his subject being "The Works of the Manchester Ship Canal." Sir Albert Rolitt, I.E.S., occupied the chair, and introduced the lecturer.

Sir Leader Williams commenced by referring to the early history of Canals, which was a matter of some interest. The advantages of inland navigation were obviously so great, that the Royal Canal in China was constructed as early as the

year 980. Its length was upwards of 825 miles, with many branches in addition to the main canal, and it occupied 30,000 men for 43 years in construction. The Suez and Corinth Canals almost traversed the same ground occupied by early canals of smaller size. In England the Roman constructed canals, one of which, the Foss Dyke Navigation, was still used in connecting the River Witham at Lincoln with the River Trent at Torksey. The introduction of locks enabled canals to be constructed through a country requiring different levels, thus saving great cost in excavation. There was some doubt as to the date of their introduction, but flashes in rivers were used before locks were invented, which appeared to have been in Italy in the fifteenth century. In 1481 two brothers named Domenico, of Viterbo, watchmakers, designed a chamber with a double pair of gates for canals, and it was adopted in the Martesana Canal. The Ship Canal to Manchester was brought about owing to the indomitable pluck and courage of the Lancashire people, and he could speak the more strongly about that as he was a Worcestershire man. He prepared his first plans for the concession in 1833, and previous to that Mr. Fulton, the well-known engineer, had propounded the tidal scheme, which was abandoned. Three severe Parliamentary contests followed, when powers were obtained to carry out the work. In the Session of 1837 the Bill passed the House of Commons, in 1884 the House of Lords, and in 1885 the Act was obtained, as it passed both Houses in the same Session; thus the Ship Canal obtained the approval of both Houses of Parliament twice over during three successive Sessions. The original scheme was to utilise the tideway of the Mersey to Runcorn, whence a locked Canal passed inland near to Warrington, and then up the Mersey and Irwell valleys to Manchester, but the strong opposition of Liverpool to the tidal portion of the scheme caused the promoters to adopt a plan by which the Canal was carried along the Cheshire side of the estuary. It was originally proposed to have the Canal 20 ft. deep and 100 ft. in width at bottom; but experience proved the advantage of the increased size adopted, namely, 120 ft. bottom width, and 26 ft. depth, without which the largest class of vessels could not have used the Canal. The lock sills were 28 ft. below ordinary water level, to allow of dredging to that depth if necessary. The soil through which the Canal was excavated was of a varied character, there being hard and soft sandstone rock, boulder and other clays, gravel and sand, loam and silt, alternating in layers, without any regularity either as to position or depth. At Latchford, within a short distance in the heavy rock cutting, the rock altogether disappeared, and was not found by a boring sunk 100 ft. below the bottom of the Canal, although the canal had been cut through the rock for a mile close to either side of the boring. By utilising the valleys river water was obtained, and the railways were taken over the Canal at a much less cost than by any other plan. For the first three years, when the late Mr. Walker was carrying out the work, no floods of importance occurred, but as soon as the company took possession of the works great floods ensued, causing great delay and cost. Stone was used from many quarries in Cornwall, Wales, Yorkshire, and Cheshire, and bricks were made on the works, while by adopting Portland cement concrete for the main part of the walls of docks and locks, it was possible, with the assistance of 230 miles of railway, 173 locomotives, and 6,300 trucks and wagons, to complete the work in a reasonable time. It was considered that the work might be finished in from four to five years, but owing to the unforeseen difficulties and delays it took six years to complete the Canal. For the excavation nearly 100 steam-excavators of various types were employed, some of which were constructed in France and Germany. There were 194 steam cranes, 182 portable and other steam-engines, and 209 steam-pumps employed, consuming about 10,000 tons of coal per month. The total amount of excavation in the Canal and docks amounted to about 50,000,000 cubic yards, 10,000,000 cubic yards of which were sandstone rock. The entrance locks at Eastham were three in number, their size being respectively 600 ft. long by 80 ft. wide, 350 ft. by 50 ft., and 150 ft. by 30 ft., while, in addition, there were two sluices of 20 ft. wide each, to assist to fill the Canal. This group of locks could admit a large amount of shipping every tide, more particularly as on all tides above the ordinary level of the Canal all the lock gates were open for a considerable period before high water. Spring-tides rose 5 ft. to 7 ft. above the ordinary level of the tidal portion of

the Canal, which extended to the next group of locks at Latchford, a distance of twenty-one miles. The total length of the Canal was 35½ miles, and from Latchford to Manchester, a distance of 14½ miles, it was filled with the waters of the rivers Mersey, Irwell, Bollin, and Glazebrook. The Canal being designed to take the place of the rivers Irwell and Mersey from Manchester to Latchford, it thus became a canalised river, continuing to be the main drain for Lancashire and Cheshire, and large sluices were provided at each set of locks to deal with land floods and surplus water. The river Weaver embankment penned the water up the river to Frodsham, a distance of three miles from the Canal, thus forming a large sheet of water available, after dredging, as a dock, for vessels of any size. This large dock was joined to the Weaver Navigation by a lock 229 ft. long by 42 ft. wide, which admitted the salt trade of Cheshire to the Ship Canal. Large locks were also built in the embankments at Weston Point and Runcorn, to allow coasters and barges to enter and leave the canal. At Ellesmere Port there was an embankment faced with stone, one mile in length, across an embankment of the estuary. On each side of the foot of this embankment close timber piling had been driven, no less than 13,000 pine piles 13 in. to 14 in. square and 35 ft. long, having been driven through sand without any trouble, by the use of the water-jet principle. At Latchford the locks were two in number, the larger being 600 ft. long by 65 ft. wide, and the smaller 350 ft. long by 45 ft. wide. At Irlam, 7½ miles above Latchford, similar locks were constructed, as well as at Barton and Mode Wheel. The last-mentioned locks formed the entrance to the Manchester Docks. All the lock gates were constructed with green-heart, a very hard wood imported from Demerara, which had been found by experience to be extremely durable. Being of wood, they were less liable to damage than those made of iron, being less easily affected by vessels striking them. The gates were worked by hydraulic power, provided at each set of locks, the engines and machinery having been constructed by Messrs. Sir W. G. Armstrong, Mitchell & Co. Near Warrington, where the lines of the London and North-Western and Great Western Railways crossed the Canal, they were raised by the construction of high-level deviation railways, so as to allow the shipping to pass under the railway bridges. The railways between Warrington and Stockport and the Cheshire Lines, near Irlam, had similar deviation railways at a high level, the total length of railway deviations being 11½ miles. The railway viaducts were in most cases considerably on the skew, and the clear spans of the openings varied from 266 ft. to 137 ft., these large spans being necessary to enable the full navigable width of 120 ft. being maintained for the Canal. There were two high-level road-bridges and six swing road-bridges between Runcorn and Barton, the spans being in all cases not less than 120 ft. The swing-bridges were worked by hydraulic power, as well as the movable aqueduct, which would enable vessels with fixed masts to pass through the Bridgewater Canal at Barton. This work had two openings of 90 ft. each, crossed by a large iron caisson resting on a central pier. This caisson was filled with water to the same depth as the Bridgewater Canal, and boats passed along it over the Ship Canal. When vessels on the Ship Canal had masts too high to pass under the caisson it was opened like a swing-bridge, the water being retained in the caisson by gates at each end. Similar gates were used at each end of the aqueduct leading to the movable caisson, to maintain the water in the Bridgewater Canal. The docks at Manchester had an area of water-space of 114 acres, the area of quay space being 152 acres, and the length of quays 5½ miles. At Partington the Canal was widened out to allow steamers to lie on either side, and branch railways were constructed, with hydraulic coal-tips, to enable either Lancashire or Yorkshire coal to be expeditiously loaded for shipping. Steamers were able to navigate the canal by day and night, and the time taken averaged seven to eight hours, passenger steamers even taking considerably less time.

The lecture was copiously illustrated by excellent lime-light views, and at the close a cordial vote of thanks was passed to the lecturer.

ENGINEERING SOCIETIES.

INSTITUTION OF CIVIL ENGINEERS.—The list of members of the Institution of Civil Engineers just issued contains the names of 1,862

Members, 3,687 Associate Members, 355 Associates, 17 Honorary Members, and 816 Students, together 6,737, being an increase at the rate of 2½ per cent. in the past twelve months.—At the ordinary meeting of the Institution, on the 2nd inst., Mr. W. H. Preece, C.B., Vice-President, in the chair, the paper read was on "Torpedo-Boat Destroyers," by Mr. John I. Thornycroft, F.R.S., and Mr. Sydney W. Barnaby, MM.Inst.C.E.

Illustrations.

NETLEY ABBEY.*

THE first monks of Netley came from Beaulieu Abbey, in the New Forest, and were Cistercians, a branch of the Benedictine order, and trustworthy records testify that the site for their sister Abbey of Netley was acquired by Robert, the first Abbot of Beaulieu, in the year 1235.

The Abbey was built at the suggestion of Sir Peter de Rupibus, or De La Roche, who was a zealous founder of monastic institutions, and was Bishop of Winchester in the early part of the reign of King John, and held that see until his death in 1238. It is probable that it was his influence with the King—whose tutor he was—that procured for the Abbey the Charters in the middle of the thirteenth century, granting land in Surrey and elsewhere for the benefit of the Abbey.

It appears probable from examination of the histories of these early grants that some earlier buildings than any of the remains of the present structure existed when the present Abbey was built, and it is conjectured that its foundation, about which there is much speculation, was due to the patron saint of Westminster, Edward the Confessor, which conjecture is confirmed by the fact of the arms of the Confessor (a cross, gong, and four martlets) being found upon one of the fosses to the vaulting of the south transept.

Netley shared in the general suppression of Abbeys instituted by Henry VIII., at which time an old authority says that the inmates consisted of twelve monks and an abbot, and its annual revenue of the value of 160*l*. Originally a monastery for Cistercian monks, it remained such for 300 years, and after the dissolution was granted by Henry VIII., with the manor of Howndes and farm, to Sir William Paulet, afterwards first Marquis of Winchester, who converted the Abbey into a private residence for his own use. These important alterations, which naturally did so much to destroy the Abbey still further, and lost such a wealth of Gothic work, are to be distinguished to-day by the square-headed windows, the use of red bricks in the construction, and a fine description of sand used in the mortar. Later on in its history it became, about the middle of the sixteenth century, the seat of the Earl of Hertford, and, in 1700, the property of Sir Berkeley Lucy. Until that time the church was practically entire. The materials were then sold by him to a builder of Southampton, named Taylor, of whom there is a quaint local legend.

It is said that after Taylor had concluded his contract, some of his friends warned him against touching the remains of the Abbey, saying they would never themselves be concerned in the demolition of holy and consecrated places. Their warnings appear to have impressed Taylor greatly, who dreamt that, in taking down the roof of the church, the keystone of the arch above the East window fell from its place and killed him. On relating this dream, he was again advised to have nothing to do with the pulling down of the building, but unfortunately for him, this advice was not followed, and it is said that Taylor's skull was actually fractured by a stone which fell from the window. This accident, however, had the effect of staying the destruction of the Abbey, and leaving it much in the same condition (allowing for time and weather), as it stands to-day.

The earliest part of the present ruins is undoubtedly that of the Abbot's house, which, as will be seen on reference to the plan, is situated a few yards from the East end.

There cannot, however, be very many years between the date of that portion and that of the

Abbey itself; it is slightly earlier in character, as the filleted mouldings testify. There is now so little remaining of the original house that it is difficult to give, with any amount of certainty, names to the several apartments. The longer one might have been, and is usually termed, the hall, and the rooms over, judging from the better finish of the mouldings, the principal apartments.

In plan, the Abbey is of the usual cruciform type, with a nave of eight bays and choir and transept, each of four and three respectively, the side aisles of the nave being continued in the choir, but in the transepts the side aisles only occur on the eastern side. On a close examination of the aisles in the north and south transepts there are found to be indications of structures formerly existing there, and which were possibly chanting chapels.

The choir in plan has that slight inclination towards the south, not so marked as in some instances, which has been supposed to symbolise the inclination of the Saviour's head upon the Cross.

The east end, where the architecture is of a later and purer date than elsewhere, and freer from the influence of Norman work, must have been in its prime, as the present remains indicate, of great beauty and refinement of detail.

The east window, the centre of attraction of the Abbey, somewhat similar to the Chapter House at Salisbury, originally consisted of four lights, with a large centre foliated ring of eight foils, the smaller one being a quatrefoil of simple design. The jamb and arch mouldings are somewhat later in date than the rest of the work and have the peculiarity of the columns arranged smaller in size as they recede from the eye, this has the effect of giving greater apparent depth to the internal jamb of the window.

In comparison with the side aisles the nave is rather beyond the usual width, and the buttresses are noticeable for their unusual strength and depth of projection.

The buttresses at the west end have a small and unusual refinement of detail, which is well worth attention—viz., that the lower set-offs are steeper than the upper. On consideration, it will be seen that this is in reality the more scientifically correct treatment, as the line of pressure tends more towards the perpendicular as we approach the ground, though it is contrary to the usual design of Medieval buttresses.

The groining of the transepts is later in date than that of other parts, and is especially worthy of remark, owing to the large and finely detailed stone brackets from which the groining springs.

It is evident, not only from the later work as shown in the detail of these brackets, but also from the insertion of the masonry itself, that the groining of the transepts was introduced after the other parts of the building were finished.

This portion of the Abbey is the latest period of its architecture, with the exception of course of the Tudor work of Sir William Paulet, before mentioned.

There is a noticeable difference in detail of the groining eastwards of the tower, where there is a double rib over each column, the space between the ribs being divided by panels with a carved rosette in each.

The spiral staircase, seen on the plan, at the north-east angle of the choir and south transept originally gave access to the triforium, and to a room over the transept groining. The three-light window of fine design still exists.

What remains there are of the doorway leading from the north transept to the sacristy indicate that it was of a somewhat elaborate character, that is, in comparison with the rest of the work. The same remark holds good with that in the east end of the south aisle of the nave.

The doorway shown in the centre of the south wall of nave is not of the same date as the rest of the work; but it is evidently of modern or comparatively modern introduction.

There are indications in the north and south wall, and in corresponding positions near to the east end, of an almonry or locker, with traces of the shelves and rebates for the doors. Near to the almonry, at the south wall, is a piscina, and there are remains of two others in the south transept.

At the west end in the northern aisle are the remains of a Purbeck marble block in the wall, which was evidently a position of a pedestal for holy water.

Adjoining the south transept is the sacristy, a room groined in three compartments, with two larger recesses originally used for the vestments, and two smaller ones, one a piscina and the other an almonry.

Over this groined roof is a small vaulted

chamber, which was formerly used for night service, and was connected with the church by small circular staircase in the south transept.

Beneath the west window, and on the north side of the altar, is a mutilated projecting sto which was probably a bracket.

The cloisters (usually called "the Found Court"), of which there are now but a few remnants left, occupied the usual position on the south-west side of the church; they extend round to the south-west and north walls and part of the east. The lavatory was at the south-east corner of the cloisters.

What now remains of the Chapter House shows it to be a most interesting example of thirteenth century work. In plan it is square, and originally vaulted in nine compartments, with four central supporting columns. The three fine arches, deeply moulded with the round and fillet, deep hollow and a scroll moulding, are sufficiently illustrated in the lithograph view published in this number, which also is seen one of the three beautiful Early English windows of two lancet lights with foliated circles in the head. Of the three arches on the west side, the centre one was the entrance and those on either side were windows originally glazed, with four lights with traceried heads similar in character to the east window of the choir.

The passage next the Chapter House formed gave access to the Abbey garden and the Abbot's residence beyond. It is simply vaulted with groins.

The refectory, or dining-hall, was the compartment situated between the kitchen and the passage leading to the garden. Its dimensions are about 80 ft. by 25 ft. There is now but very little left of the original vaulting, and a large elm-tree grows in the centre of the hall. It was originally vaulted and groined in ten compartments, with four central supporting columns. Since it was first built, and probably when the inmates of the Abbey were much reduced in numbers, the refectory was divided in the centre by a stone wall and in it were recently found imbedded the buttress and part of the shaft of one of the columns. The detail is similar to the columns of the choir. The hall had originally a hooded fireplace apparently somewhat like that of the kitchen.

The kitchen, the next compartment south of the refectory is, perhaps, after the Chapter House the most attractive part of the conventual buildings. It is of the same period as the rest of the work, and the chief interest in it is the hooded fireplace on the north wall, which is a very fine specimen of Early English work. There remains of brackets in the corners supposed to have been used for lights.

The kitchen measures 50 ft. long by 18 ft. 6 in. wide, not including the enclosed spaces adjacent to the south wall. These enclosed places are supposed by some authorities to give weight to the supposition that the drain from the fish-pond, which is immediately below, was originally secret passage way from some Manor house existing to the north-east of the Abbey. The spaces have no connexion with the ground floor but there is a small door over the kitchen which directly communicates with the drain. The small room at the south-east, having a hatch, was, all probability, the dining-room, and the passage immediately next it, the kitchen.

The buildings—or rather the remains of the buildings—on either side of the entrance, were erected in the reign of Queen Elizabeth, and are apparently old foundations.

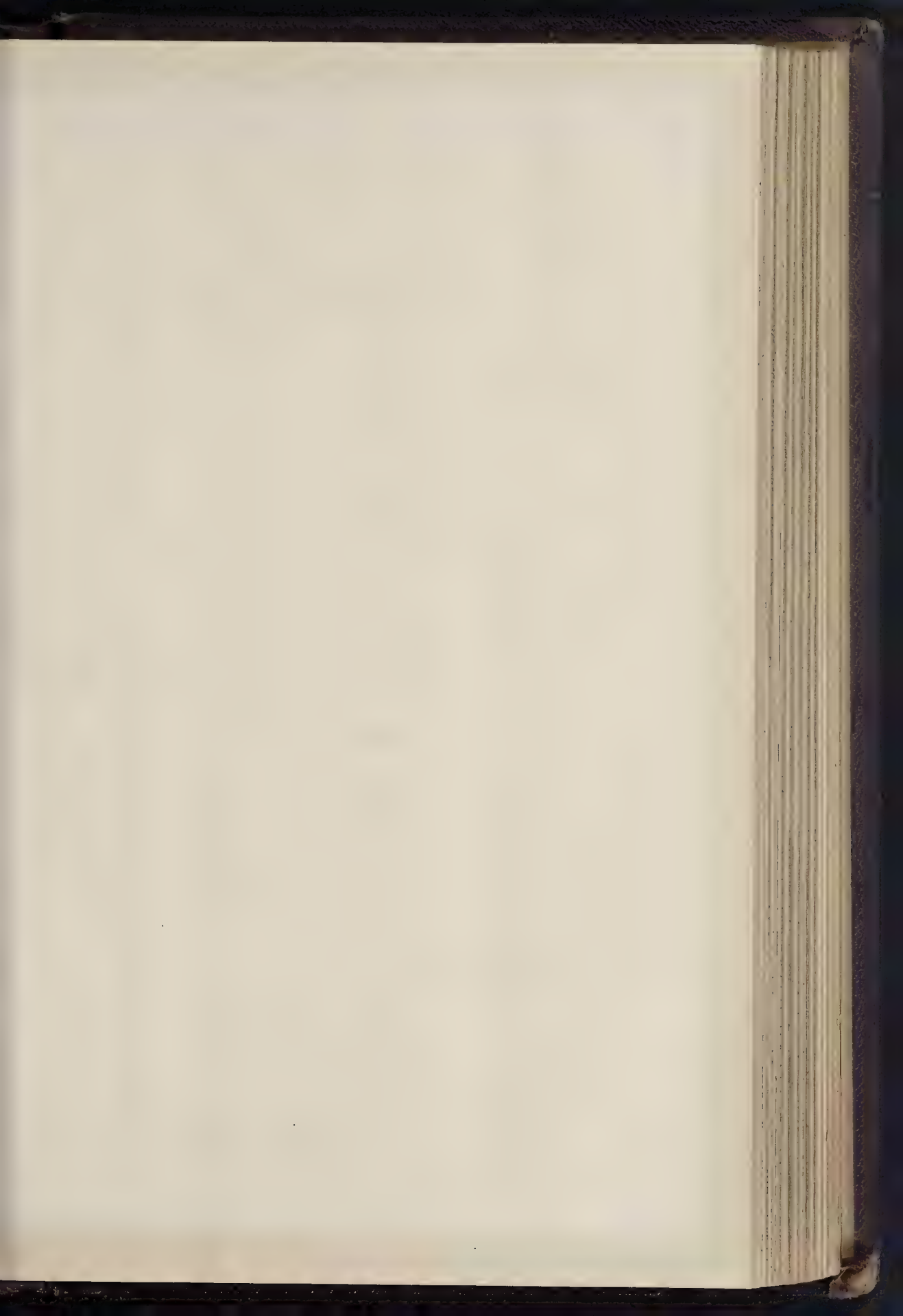
The centre portion formed the principal entrance, with an octagonal turret on each side for the gate-keeper or porter. At each end the range of buildings are to be traced the foundations of a hexagonal turret for a staircase leading to the upper apartments.

There was formerly here no less than five fireplaces, and each fireplace is constructed with two flues. It has been suggested that this was done on principle, and that the double flue was supposed to act as an inverted syphon, the draught passing down one flue and up the other, the preponderating draught upwards being in the flue opposite to the doorway or other principal opening.

The passage seen on the plan, next the Chapter House, formed a communication from the cloister to the garden, and the ruined building beyond supposed to be the Abbot's residence. The passage has a simple vaulted ceiling, with groins.

Next to the passage on the plan is the refectory, with three windows in the eastern wall. It measures about 70 ft. by 25 ft., and the groining ceiling, now entirely disappeared, was supported in the centre by a range of four circular columns.

* The series of the "Abbeys of Great Britain" is continued this month with illustrations of "Netley." Particulars of this and of the three Cathedral series ("England and Wales," "Scotland," and "Ireland") will be found on p. 272; also (on page 1) of the recent re-issue, in book form, of the series of English and Welsh Cathedrals.

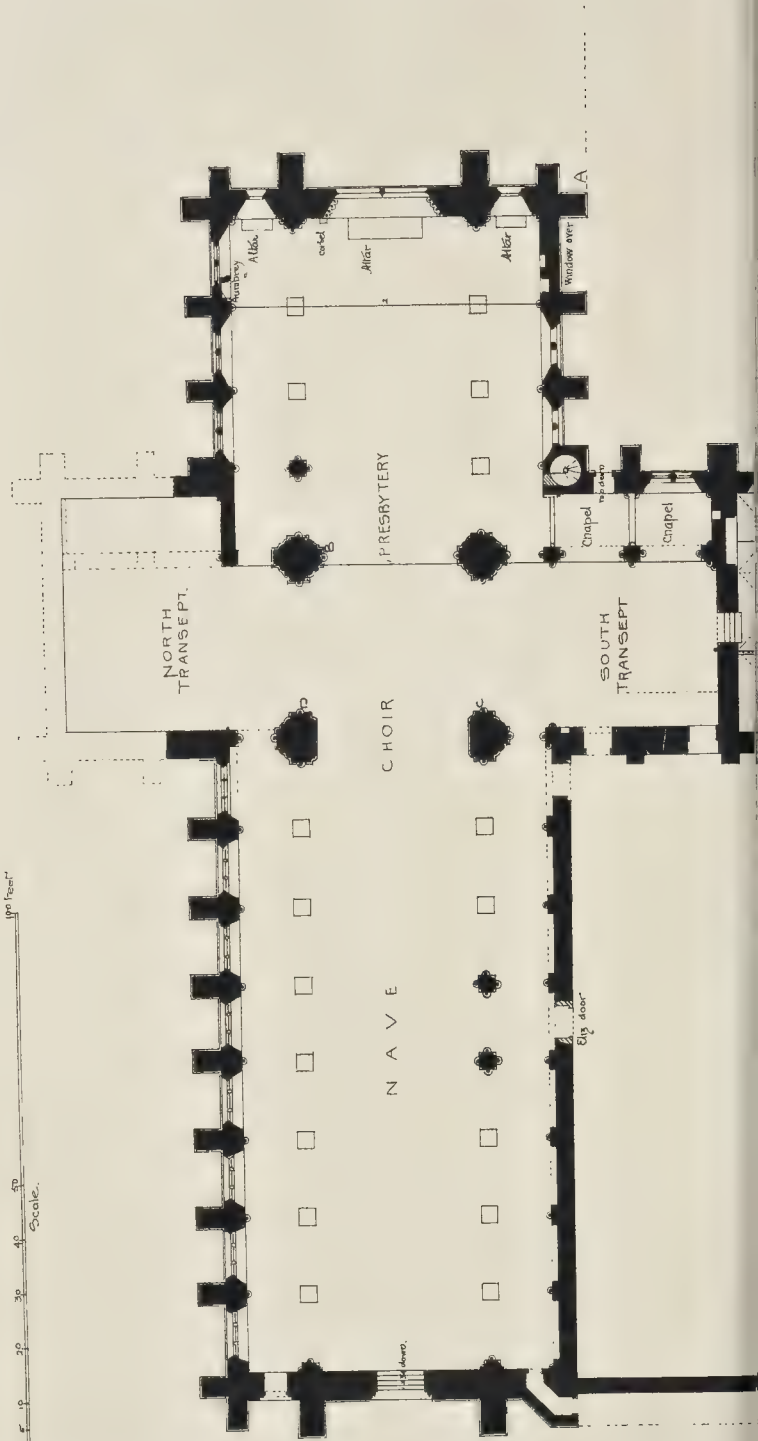


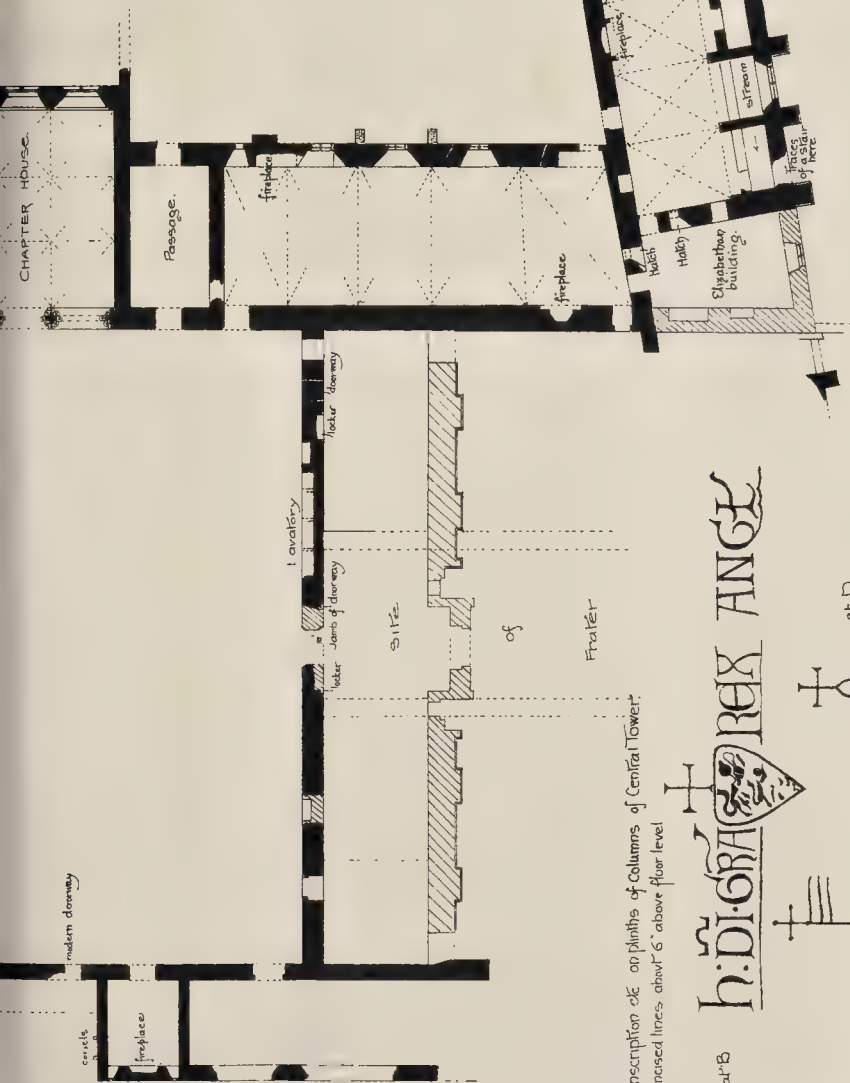
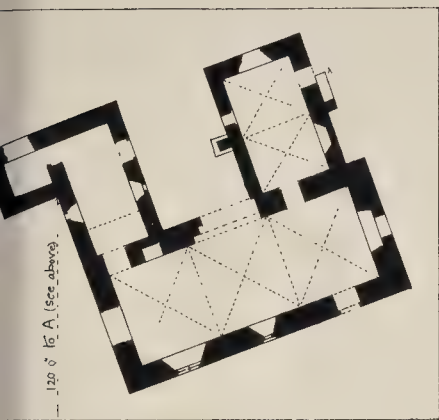
THE BUILDER, APRIL 6, 1895.

NETLEY ABBEY. Ground Plan.



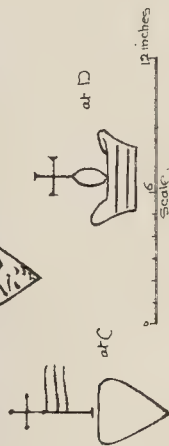
Transitional - E.E. is Decorated
 Decorated
 Elizabethan additions





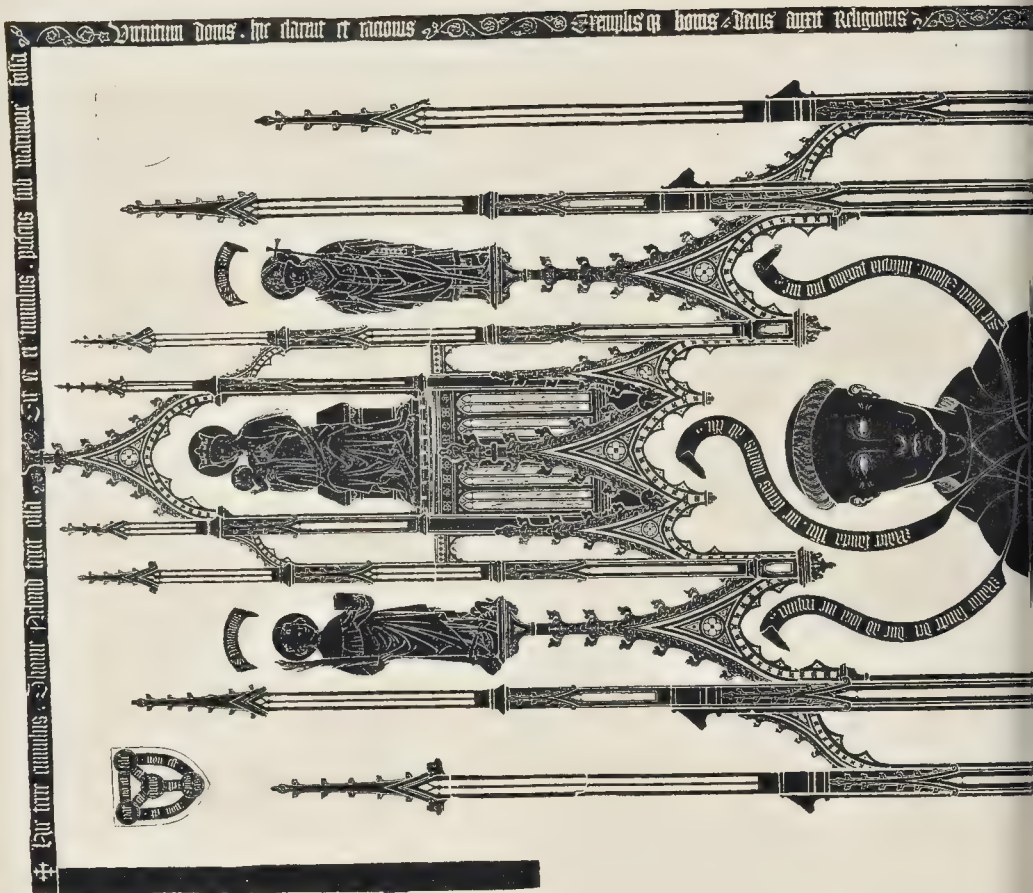
Inspection of on plinths of columns of Central Tower:
Incised lines about 6" above floor level

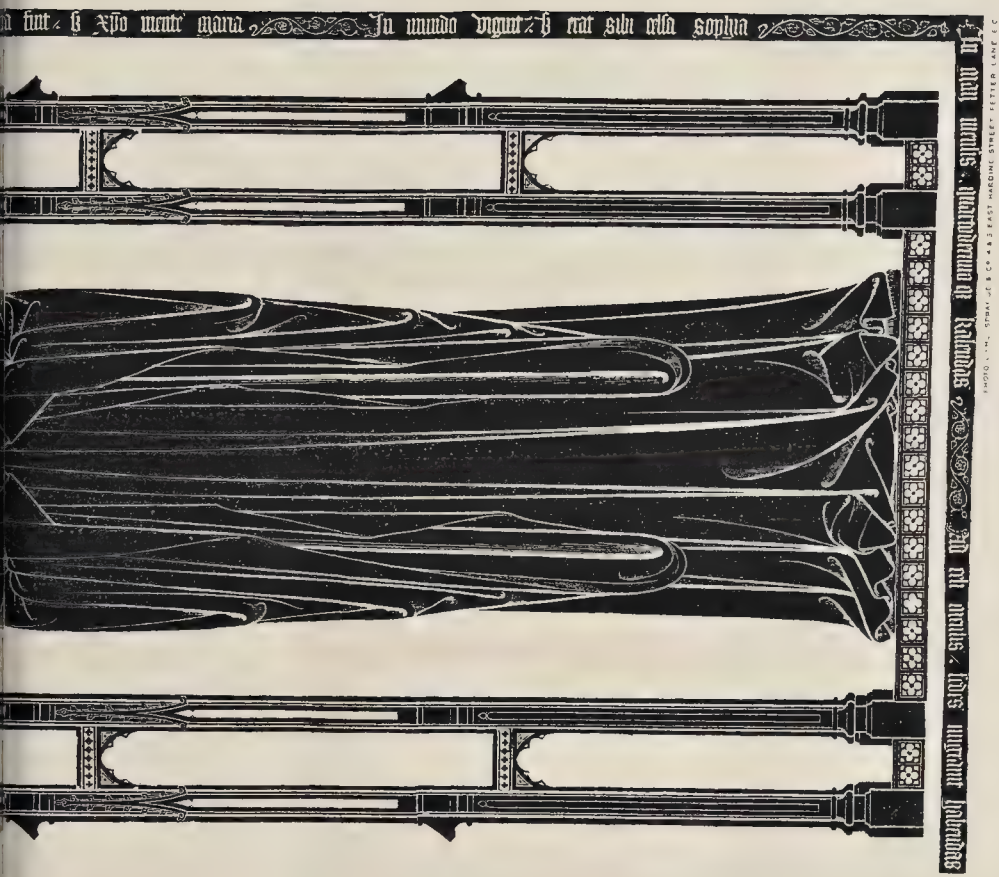
at B h:DI·GRA REX ANGL



*Photo by Paul
1905-1910*

12ur erit ruminans . saporis p[er]fectus erat illa . et ei ruminans . p[re]cisus tibi marmore folia





BRASS OF THOMAS NELOND (A.D. 1433) COWFOLD, SUSSEX.—FROM A RUBBING BY MR. C. W. B. BRIDSON.

All this work is contemporary with the rest of the Abbey, and the section of the base-mouldings and the columns of the groining is similar to those in the church itself.

There are recesses in the walls of this room.

BRASS OF THOMAS NELOND,
A.D. 1433, COWFOLD, SUSSEX.

The brass here illustrated lies in the Church of the Holy Trinity at Cowfold, Sussex, in commemoration of Thomas Nelond, who was Rector of the church and Prior of the Cluniac Monastery at Lewes. The figure of the Prior, in the dress of a Cluniac monk, is represented under a triple canopy, which is one of the finest and most elaborate known to exist amongst English brasses.

In the centre compartment is the Virgin with the Infant Saviour; on her right hand is St. Pancras (the patron saint of the foundation), and on her left St. Thomas of Canterbury, representing a beautiful little specimen of archiepiscopal robes. To each of the figures a prayer is addressed.

The Latin inscription round the margin records the name of Nelond, with the comment that he was a pattern and example of a holy life, "a Martha to the world and a Mary to Christ."

The illustration is from a rubbing by Mr. C. W. B. Bridson.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of this Council was held on Tuesday, in the County Hall, Spring Gardens, Mr. Arthur Arnold, Chairman, presiding.

The Works Department.—Paragraph 11 of the Finance Committee's report was as follows:—

"We have had under consideration the charge which should be made to the Works Department for the proportion of establishment expenses incurred at the central offices, and also under other heads for the year 1894-95. The comptroller calculates the extra cost for salaries and expenses in this department for the current year, in connexion with checking and auditing the accounts and books of the Works Department, at 660*l*. Up to Ladyday, 1894, the Council paid a rent of 500*l*. a year for the central wharf, and this amount as of course charged to the Works Department, but the Council has, as from that date, purchased the freehold of the wharf, and new workshops and offices are in course of erection there. It has therefore been necessary to consider what charge shall be made for the interest on and repayment of original capital outlay. We have carefully gone into the question, and, having regard to the amount paid for the purchase of the central wharf and the outlay for works, have arrived at the conclusion that a fair and reasonable sum to charge the Works Department for interest on capital (in place of rent) would be 1,234*l*. 5*s*. 6*d*., and for repayment of 2-5th of the capital, 748*l*. 0*s*. 11*d*., making together 1,982*l*. 6*s*. 5*d*. As to the interest to be charged on what may be regarded as the working capital, the Council is aware that the advances made to the Works Department for purchasing plant and materials have been made out of the general funds of the Council, so that from time to time the cash balance has been reduced to a certain extent, and a certain loss of interest has been incurred by the depletion of the account. We think the case will be met by charging as interest an average deposit rate of interest, which for the current year has been exceptionally low, and calculated on the estimated value of the stock of materials and plant in hand at the end of each quarter, the charge would amount to 425*l*. The interest charged for 1893-4 (243*l*. 15*s*.) was given in a similar manner. The Council on the 19th 1894 directed that "in order to cover the extra cost to be incurred by the Works Department in supplying details of estimated cost of jobbing works under the agreed schedule of prices, a contribution be made to the Works Department out of the general establishment expenses, such amount to be agreed upon at the end of the current financial year in connexion with other financial adjustments with the Works Department, which will then have to be made." Information has been furnished as to the persons employed in connexion with measuring works and the preparation of the schedule of prices, and the sum of 300*l*. has been fixed as a proper amount to allow the Works Department on this account. We have had a conference with the members of the Works Committee, who were deputed to arrange the matter, and have discussed the subject fully with them, and they concur in the following recommendations, which we submit for adoption, viz:—

(a) That a charge of 660*l*. be made to the Works Department in respect of salaries and expenses at the central offices for the year ending March 31, 1895. (b) That a sum of 300*l*. be allowed to the Works Department

in respect of the same period for extra cost incurred in supplying details of estimated cost of jobbing works, in pursuance of the Council's resolution of June 19, 1894. (c) That the amount to be charged (in lieu of rent) to the Works Department for interest on and repayment of original capital outlay on the central wharf and buildings for the same period be 1,982*l*. 6*s*. 5*d*. (d) That the amount of interest to be charged to the Works Department on the advances made for purchase of stock and plant during the present financial year be 425*l*."

Recommendations a, b, and c, having been adopted,

Sir John Lubbock, M.P., moved on d to substitute the words: "At the rate of 3 per cent." for "425." In his opinion the "call" rate should not be adopted, because the money was not obtainable at call.

The amendment having been seconded, Alderman Ritchie, in supporting it, said that the Works Department should be upon the same basis as the contractors, and that, as the latter could not borrow money for the purpose at the call-rate, the Works Department should not be permitted to do so.

Mr. Hoare (Chairman of the Committee) said the contractor would not charge in his profit and loss account for the repayment of capital, whereas the Works Department had to do so; and one thing had to be set against another.

Sir J. Lubbock contended that the contractors' accounts provided for depreciation and the payment of interest on capital.

Mr. Goodman said contractors, when they were engaged on any undertaking, drew 88 per cent. every month of the value of the work done, whereas the Works Department only received from time to time the amount of the wages that had to be paid.

On a show of hands there voted 48 for the amendment, and 51 against it. The Council divided with the following result:—For the amendment, 56; against it, 63.

Recommendation (d) was then adopted.

The Parks Committee, later in the meeting, brought up the following report:—

"On November 13, 1894, we reported to the Council that the cost of certain works undertaken by the Works Department had exceeded the estimates, and the Council then sanctioned the additional cost which had been incurred. The Comptroller has since reported to us that the final ascertained cost slightly exceeds the additional expenditure sanctioned by the Council, as shown in the following table:—

Name of place.	Work.	Estimate accepted by Works Department.	Corrected estimate after measurement of completed work.	Amount already sanctioned by Council.	Further amount required.
		£	£ s. d.	£ s. d.	£ s. d.
Southwark Park	Cricketers' shelter	200	274 2 9	632 4 3	4 6 7
Victoria Park	Refreshment house	1,000	1,029 5 0	1,517 15 9	2 7 0
Clapham Common	Conveniences	700	797 17 0	1,054 12 0	4 11 2
Bethnal Green Gardens (Poor's Land Section)...	Boundary railings	2,200	2,170 16 10	2,275 12 1	0 10 6

We recommend—

"That the Committee be authorised to incur a further expenditure of 112*l*. 15*s*. 3*d*. in respect of the cost over and above the accepted estimates of works carried out by the Works Committee as above enumerated."

Alderman Ritchie asked for an explanation of the increase.

Mr. Ward (Chairman of the Works Committee) said that when the department made a profit nothing was said upon the subject, and the Council did not even know at the time of the circumstance, because it was only when additional money had to be voted that the matter had to be reported upon by a Committee. Of the total number of works executed which had been reported upon, it was shown that the estimate amounted to 66,000*l*., whereas the actual cost had only been 63,000*l*.

Sir J. Lubbock asked how it was that there had been no report as to the completed work since October.

Mr. Ward said there was great difficulty in making out the final accounts. Besides, the Council had passed a standing order directing the Committee to report twice a year—in April and October; and further particulars would, therefore, be forthcoming in a few weeks.

The report was adopted.

Government Buildings.—Mr. Burns, M.P., asked the acting Chairman of the Building Act Committee if he would consider the advisability of approaching Her Majesty's Office of Works in order to see whether in the building of post-offices and other Government buildings, it would adapt itself to the general lines of frontage determined by the local authority?

Mr. Roberts said the Government always

fought hard to get itself exempted from the Building Acts. He wished the Council had control over such buildings as Mr. Burns referred to.

The Council, having transacted other business, adjourned soon after seven o'clock.

COMPETITIONS.

SCHOOLS, SWANAGE.—The first premium in the competition for new schools at Swanage has been awarded to Mr. W. F. Taylor, of Aylesbury, and the second to Messrs. Houston & Houston, 13, Fumival's Inn, London.

NEW SCHOOLS, NORTH SHIELDS.—We understand that in the recent competition for new schools, Coach-lane, North Shields, the plans of Messrs. Marshall & Dick have been placed first in order by the assessor, Mr. E. R. Robson. The schools have been planned to accommodate 1,350 children; accommodation has also been arranged for pupil teachers' central teaching rooms, and for special subjects, including chemistry, cooking, art, &c. The estimated cost is about 15,000*l*.

NEW HOTEL, NEWCASTLE.—The directors of the Belfast and County Down Railway Company, assisted by Mr. Alfred Waterhouse, R.A., assessor, have awarded the premiums in connexion with the competitive designs for the new hotel at Newcastle. The first premium, of 100*l*., was awarded to Mr. James J. Farrall, M.R.I.A.I., of Westmoreland-street, Dublin; the second, of 75*l*., to Messrs. Gibson & Russell, Associates, R.I.B.A., of 11, Gray's Inn-square, London; the third, of 50*l*., to Mr. F. H. Tulloch, A.R.I.B.A., 39, Victoria-street, Westminster, and Mr. Lionel Littlewood, F.S.I., of 49, Doughty-street, Bedford-row.

ARCHÆOLOGICAL SOCIETIES.

SURREY ARCHÆOLOGICAL SOCIETY.—The fortieth annual meeting of this Society was held at 8, Danes Inn, Strand, on the 27th ult., when the President, Viscount Middleton, occupied the chair, and moved the adoption of the report of the Council and statement of accounts. The report stated that the committee appointed at the last annual meeting to visit Guildford in search of suitable accommodation for the head-quarters of

the Society, duly met and visited that town, but failed to find any place at all suitable. A report was made to the Council, and it was determined that no action could be taken at present, bearing in mind that suitable premises might at some future date be available. The report went on to state that the annual excursion was held on Wednesday, July 18, 1894, the meeting-place being Farnham, whence Bentley, Froyle, and Cronall were visited. The Council took this opportunity of returning the thanks of the Society to all who assisted in rendering the meeting successful (see *Builder*, July 28, 1894). The part of the Society's "Collections" (vol. xii., part i.) for the year 1894 was issued to all members not in arrears with their subscriptions. In this part is a valuable paper on "Compton Church," by Mr. J. L. André, F.S.A., and one on "The Manor of Lambeth," by Mr. S. W. Kershaw, F.S.A. The catalogue of church plate is still being continued, as are also the extracts from Surrey wills. The "Visitation of Surrey" is drawing to a close, and the editors hope to finish it in the next part. The finances of the Society need strengthening by the addition of more annual subscribers. A substantial addition to the number of such subscribers would enable the Council to enlarge and better illustrate the publications of the Society. The London and Middlesex Archaeological Society, for many years the joint-tenant of the room in Danes Inn, has recently determined its tenancy and moved away. Unless a new co-tenant can be found, this will still further burden the Society's finances. The library still further continues to increase by exchanges from kindred societies, but from lack of

funds it is impossible to keep up the binding of the various "Transactions" received. The following members of Council retire by rotation, but are eligible for re-election, viz.:—The Hon. G. C. Brodrick, D.C.L.; G. E. Cokayne, F.S.A.; F. A. Crisp; Colonel Davis, F.S.A.; J. F. Eastwood; E. Freshfield, LL.D.; W. More Molyneux; and Ralph Nevill, F.S.A. The number of members is 313. During the year 14 new members have been elected. By death the Society has lost 4 members, and by resignation 7 members; total, 11: gain over loss, 3 members. Although not strictly within the limit of this report, the Council desires to refer to two events which have occurred in the early part of the year 1895. The first is to record the loss the Society has sustained in the death of Mr. J. W. Butterworth, a Vice-President, and one of the founders of the Society. Mr. Butterworth died on January 8 last, and the Council, on behalf of the Society, took the first opportunity of passing a resolution conveying to his representatives the condolences of the Society. The second event to which the Council desires to refer is the issue of the "Calendar of the Feet of Fines for the County of Surrey, from Richard I. to Henry VII." For those working on the early history of the county this Calendar will prove of the greatest service, for there is no Calendar to this class of document in the Public Record Office. The Calendar is appended a complete index, both of names and places, this alone represents a long and tedious amount of work. The Council desires to convey to Mr. F. B. Lewis, the editor, the best thanks of the Society for not only kindly placing the MS. at the disposal of the Society, but also for preparing the index and seeing the work through the press. The original estimate for publishing this Calendar has been slightly exceeded by reason of the work having been issued in cloth instead of in paper covers as usual. To cover this and sundry small items for delivery and postage, the Council proposes to ask permission to borrow, on the same terms as before, a further sum of 20*l.* from the reserve fund, in order to discharge this liability. Mr. J. F. Eastwood, in seconding the motion for the adoption of the report, said the Surrey County Council was about to build a science and art building at Kingston, very close to the county hall, and the building was to have a county museum, and it was now a question whether it might not be possible to ask the County Council to receive and show their collections for them. It would save them many expenses, and might in every way be desirable. He thought that the proposed building at Kingston would make a capital home for the Society, and it was quite time they had one. The report and balance-sheet were unanimously adopted, and the retiring members of the Council were re-elected. Mr. Mill Stephenson, F.S.A., and the Rev. T. S. Cooper, M.A., were re-elected Honorary Secretaries, and Mr. W. F. Potter and Mr. C. T. Davis, auditors, and Mr. W. P. Ivatts was re-elected Collector to the Society. The meeting was then made special, pursuant to notice, when Mr. Ralph Nevill moved the following resolution:—"That the Council be empowered to borrow a further sum of 20*l.* from the reserve fund, in order to discharge certain liabilities in connexion with the publication of the 'Feet of Fines'; the same to be repaid by annual instalments of not less than 10*l.* per annum." This was carried unanimously, and votes of thanks to the President and officers closed the proceedings.

ARCHITECTURAL SOCIETIES.

EDINBURGH ARCHITECTURAL ASSOCIATION
EXCURSION.—An excursion of the Edinburgh Architectural Association was taken on the 30th ult. by over thirty members. Starting from Charlotte-square, they drove first to Dalmeny House, through which they were conducted by Mr. Hippolyte J. Blanc, A.R.S.A. Proceeding next to Barnbougle Castle, Mr. Blanc gave a sketch of the once powerful family of the Mowbrays. Continuing the journey to South Queensferry, Mr. Thomas Ross, F.S.A.Scot., conducted the party over the Carmelite Priory Church, and described its outstanding points. Erected by the family of Dundas, of Dundas, probably about the latter half of the fifteenth century, the building was in ruins till some six years ago, when the Dean and Chapter of St. Mary's Cathedral, Edinburgh, had it fitted up as a place of worship. In the course of the outing the historic church of Dalmeny was also inspected. Mr. Blanc pointed out the features of interest in plan, and especially in the numerous details of the church, noting its harmony in these respects with contemporaneous work in France and

England. Comparison was also made with analogous features in Leuchars, St. Margaret's Chapel, Duddingston, &c. Mr. Blanc and Mr. Ross were cordially thanked for their services.

GLASGOW ARCHITECTURAL ASSOCIATION.—The general monthly meeting of this Association was held in the rooms, 114, West Campbell-street, on the 2nd inst., Mr. A. N. Paterson, President, in the chair. Mr. N. Secretary, Mr. Walter R. Watson, read a paper on "Sir Christopher Wren." The essayist, in his opening remarks, gave a historical and descriptive account of England in the middle of the seventeenth century, and explained the state of general science and the architectural practice of the period. The chief events of Wren's interesting and eventful career were then alluded to, notably the visit to Paris, and it was shown under what advantageous circumstances that visit was made. Referring to the circumstance that Wren, unknown even as an architectural amateur, was selected to assist the Surveyor-General, the lecturer remarked that he was at that time, more than any other man in the kingdom, equal to anything of national importance that might be required. His love for architecture was only a part of his sympathy for everything that could appeal to a man of genius; had there been no mathematician of eminence besides himself, nor any remarkable poet, painter, or sculptor, Wren would have been all or any of these, as the necessity of the time might have required. The second part of the paper was devoted to a description of a few of the great architect's better-known works, and was illustrated by diagrams, photographs, &c. In concluding, Mr. Watson said the genius of Wren was doubtless greatly influenced by the moral goodness of his character; he might be regarded as a perfect example of the Vitruvian model, worthy, in every sense, of his self-erected mausoleum and of the noble epitaph which confirmed its dedication.

Correspondence.

To the Editor of THE BUILDER.

CARDIFF, SOUTH WALES, AND MONMOUTHSHIRE ARCHITECTS' SOCIETY.

SIR,—Your editorial note of March 9, commenting adversely on the action of this Society in sending a memorial to the Corporation asking them to invite a public competition for designs for the new Museum and Art Gallery proposed to be built in Park-place, Cardiff, was reprinted in the *Western Mail*, with one-third of it omitted, and this the most important part of your article. The part I mean reads as follows:—"A delay of two years occurred, after which it was proposed to remove the Museum and Art Gallery to another site, a site which Mr. Seward approved of, but the library alone was proceeded with, and is now approaching completion from his designs, and it was understood that he would be commissioned to carry out the Museum and Art Gallery whenever a fitting site was obtained. This has now been done, and Mr. Seward, at the request of the Corporation, has reported on the site and sketched some alternative plans."

I wrote to the *Western Mail* pointing this out, and asking why this most important information should have been given to the editor of the *Builder* and withheld from our Society and from the Cardiff papers, but to this communication I have received no reply, and no notice has been taken of my request. I presume Mr. Seward must have supplied you with this information, for it has appeared in no Cardiff paper.

If Mr. Seward was promised by the Corporation two years ago that when a suitable site was obtained for the new Museum and Art Gallery, and if the Museum Committee had requested him to prepare sketch-plans for the new site, then to all intents and purposes he was its architect, and the Society of which I am President had no right even to ask the Committee to arrange its competition on the lines suggested by the Royal Institute of British Architects. And at least five of the members of the Museum Committee have grossly misled the Museum and the members of the Society. I have been told personally by one of the oldest and most respected members of the Corporation that it has not given Mr. Seward this promise, and that the sketch-plans which he has prepared were prepared entirely without the authority of the Committee, and prepared by Mr. Seward as a private member of the Museum Committee without its sanction or request. Moreover, there is no minute of the Corporation setting forth this promise, and no minute of the proceedings of the Museum Committee requesting Mr. Seward to prepare these sketch-plans.

We also had at our meeting of January 25 last, when we passed the following resolution:—"That unless they (the Museum Committee) have already pledged themselves to any architect they should

invite a public competition for designs for the new Museum Buildings in Park-place, the competition to be on the rules of the Royal Institute of British Architects." A letter from the Vice-Chairman of the Museum Committee, which reads as follows:—

"38, Charles-street, January 24, 1895.
DEAR CORBETT.—The Museum Building Committee was only appointed last week, and so far has not even been called together, much less appointed any architect, and therefore, for the present, to anyone. My own opinion is that plans will be advertised for in the usual way.—Yours very truly
(Signed) C. T. VACHELL."

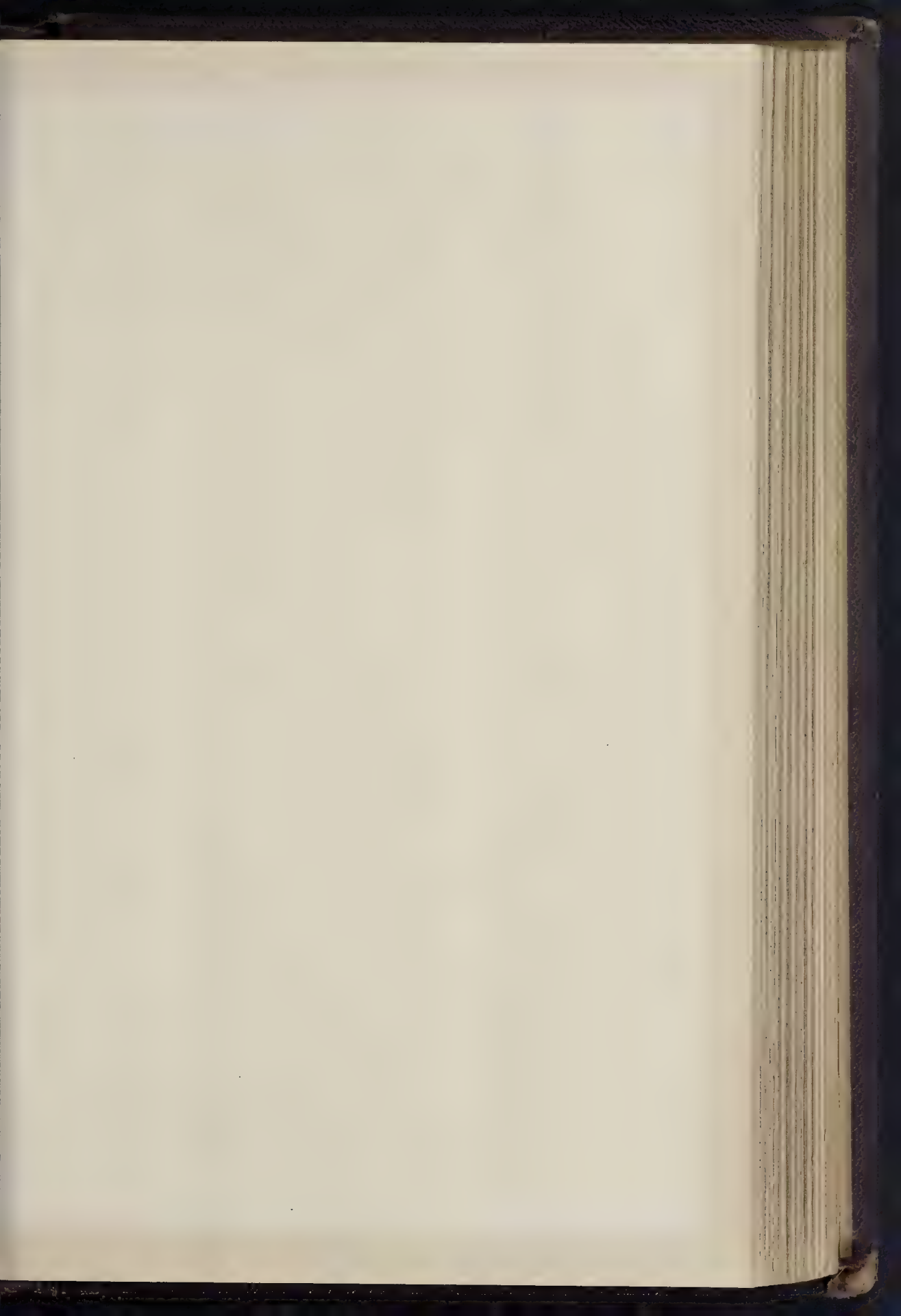
Dr. Vachell is one of if not the most active members of the Museum Committee, and for many years past has taken the greatest interest in the Museum. I believe he is scarcely ever absent from the meetings of the Committee, and at least ought to have known whether they considered themselves pledged to an architect. In an interview I had with him before our meeting, he even spoke in more emphatic language, and told me that it was the intention of the Museum Committee to advertise for plans. Again, at the meeting we had the same information given by Mr. Corbett, the first Chairman of our Society, and one who took a very prominent part in its organisation—that several members of the Museum Committee had seen him respecting the land in his capacity as agent to Lord Bute, and he given him to understand that the Committee intended to advertise for plans for the building.

We also had a letter from Mr. Seward, in which he said that the work was in his hands, and that he had a legal claim to it. This being so, we were bound to respect Mr. Seward's claim, and the words of Dr. Vachell and Mr. Corbett, our first Chairman, and by passing the resolution before quoted (our only sin) we did both, for we had to do so, and for knowing that a convincing petition would be advertised, and we wished it, a thought it our duty as a Society to make the most request that the competition should be on the lines suggested by the Royal Institute of British Architects, and I feel certain that you, Sir, and the press generally will agree with me that in offering such a suggestion, the Committee were doing one of our simplest duties.

But what really are Mr. Seward's claims? I find, then, Messrs. James, Seward, & Thomas, the year 1880, won the competition for designs for the Free Library, Museum, and Art Gallery, and the firm carried out this building. In 1881 they were commissioned to extend this building, although even at that time there was a desire on the part of the committee to advertise the extension competition; but the principal members of the Society at that time petitioned the committee to employ his firm, for right professional reasons, without hesitation. The extension was to cost 12,000*l.* but the contract, without extras, and the building fast approaching completion, has cost 18,000*l.* although the extension of the Museum and Art Gallery, as first contemplated, was abandoned of their design.

The Corporation have now acquired another site quite, as I said in my former letter, half a mile away from the present building and the only way so far, that Mr. Seward has done for the new separate scheme is to prepare sketch plans on his own authority and to assist the committee in his honorary capacity as a member of that Committee.

I have had no desire from the first to discuss Mr. Seward's claims in public or elsewhere, but his action has forced me to do so. The letter which he wrote to me and intended me to read at an annual dinner in February last, containing as it did in its second sentence an accusation against the Society of a grave and serious nature and bristling with the very strongest terms—such as "barbarism" and "injuring his 'professional practice,'" "crude, inequitable," and the like—would have been quite out of place in such a gathering composed as it was of a number of guests quite unconnected with the profession, and I felt fully justified in not reading it or alluding to it. And this incident he claims, by his letter appearing in your issue of the 30th ult., to have roused public interest in his claims, and how this could have been the case when no eye but my own had seen that letter, passes my understanding. It is true that letter appeared in print in both our local papers, and Mr. Seward alone was responsible for this publicity, and therefore me into print, and to undertake a most unenviable, objectionable, and disagreeable task, more or less discussing, in quite the wrong place, his claim to act as the architect for the new Museum and Art Gallery. I have received one letter on from a local architect, suggesting that the conduct of our Society in this matter should be submitted to the President of the Institute, and I have not replied to his letter as I received it just after submitting the whole of the correspondence to you, Sir, and shall be glad now that you have the whole of the facts before you, if you will give expression to your opinion of the matter, or I am sure the Society will give its sanction, if you think it necessary, to placing the whole of the correspondence before the President of the Institute. I am the more ready to adopt this course, for I am certain that no single member in Cardiff, South Wales, and Monmouthshire Architects' Society, has any desire or wish





THE CHAPTER HOUSE, NETLEY

FROM A DRAWING BY THE EDITOR

Cardiff, April 3, 1895.

THE TECHNICAL EDUCATION
CONFERENCE.

Your correspondent, Mr. Wright, states that the

JOHN DAVIES.

JOHN CECIL WILLIAMS.

Daisy Villa, Heath and Reach, Beds.

XIII. AND XIV.

DURABILITY OF BRICKS (continued).

It is difficult to consider the "vegetation" of bricks apart from that of the mortar in which they are set. This latter, as everyone knows, often

yields an abundant flora in favourable situations. If bricks were much affected by the action of organic acids derived from wall vegetation, they would speedily decay from growths in the mortar rather than from any plants they themselves could sustain. The principal harm done by vegetation in mortar is where the plants are large and their roots penetrating bricks by way of small cracks widen these later by pressure during growth. The brick would have to be of poor quality, however, that would be much affected by this. Walls which come to grief by the growth of vegetation on them have usually suffered by the cohesion of the mortar having been destroyed.

The question has often been raised as to whether the durability of bricks is in any way impaired by permitting the growth of ivy upon them; the answer to this is, emphatically, no, so far as the bricks are concerned, unless they are of very bad quality indeed. We will not say, however, that the stability of a wall may not be affected thereby; that is a different matter. A thick mantle of ivy tends to protect bricks from inclement weather, and in many cases keeps their surfaces quite dry, so that they are shielded from weathering influences. At the same time, thick rootlets occasionally split bricks, and warp or twist the wall. Ivy should not be permitted to grow on walls that are not substantially built, as it is apt to undermine their foundations.

In regard to the durability of bricks for specific purposes, we have partially described the qualifications of good fire-bricks in another connexion. Quite a large number of these is used for ordinary building, though we have often suspected whether they have not been "specially" manufactured for this purpose. When used as linings for furnaces they are not only subjected to great divergence in temperature, but are brought in juxtaposition with the contents of the furnace, which enter into alliance with them unless they are proof against the union. Repeated alternate expansion and contraction naturally destroys their nature in time, and leads to the formation of cracks; but the durability of a fire-brick, as such, is more particularly governed by its refractory behaviour in the presence of a flux, and each case must rest on its own merits. When simply used for lining flues, refractoriness as against heat alone is its best qualification. Its temper is sorely tried on being used in glass furnaces, where, however, the raw fire-clay by itself is often only employed.

Bricks for use in chemical works should be practically proof against powerful corrosive acids. A great number of different kinds theoretically answer this description, if one is to judge from the results recorded on selected examples as given in commercial circulars; but the action bricks are frequently subjected to in most chemical factories is infinitely more powerful than is capable of being produced in the laboratories of the average analytical chemist, and we doubt whether anything short of practical tests in the factory is able to indicate the durability of bricks under such trying circumstances. The more pure silica they contain the better for most purposes, but occasionally it is well to carry out the chemical manufactures in presence of bricks chemically prepared, though this is not often done, except in a rough way.

The durability of paving bricks is as much bound up in the production of a non-slippery as of a durable material. The most durable paving brick that could be devised would no doubt be of a very slippery nature, but it might also be very brittle and not capable of withstanding heavy weights. A paving brick, in addition to these qualifications, ought to be almost non-porous and not easily disintegrated by friction. It is questionable whether bricks of any kind that have been burned, as distinct from concrete blocks, are really suitable for street paving. In stables, in courtyards, and the like, they find a proper place, but it is purgatory to walk for any length of time on footpaths laid with the average paving brick. It is seriously believed in some quarters that sufficient foothold is produced by diagonally channelling the bricks. The durability of paving bricks, *per se*, depends on their capability of withstanding heavy weights suddenly applied, and as suddenly taken away, the general effect being of the nature of a blow. They must therefore be very tough. We have never seen tough paving bricks that did not become slippery on being subjected to street traffic. But, if they possess that disadvantage, they are as a rule not very porous, and are distinctly good from a sanitary point of view. The powerful organic acids found in the stable and in the refuse of streets, which will affect almost any kind of road-metal or paving, save,

perhaps, the best asphalt, do not decompose the average paving brick.

This seems a fitting opportunity to sum up the qualities that should be ascertained in good building bricks. There is but little to fear on account of their behaviour from a chemical point of view in the atmosphere, as bricks, unless obviously very inferior, are not materially affected by the solvent power of rain-water with its accompanying acids in solution. They should not present more cracks and small fissures than can possibly be helped, and bricks in which the cracks radiate from certain points should be rejected, as the expansion of ice within, during frosty weather, tends to split them in all directions. In order to test whether a brick is well burned, break it in halves and note the appearance presented by the fractured parts, which should be practically the same tint from the centre to the outside. A sound brick can often be judged from its characteristic metallic ring, but that is not an infallible test in glazed bricks having an extremely hard metallic-looking surface and soft interiors. It is always easier to ascertain the quality of a brick by breaking it in pieces and regarding the fragments than by any other "rough and ready" process. By that means not only can thoroughness of burning be determined, but some idea of its strength is derived. A durable brick should not contain white patches when burnt, nor should any little stones or gross particles be present. A great deal may be learned, by rubbing two bricks together, as to how far the particles composing them have become agglutinated in burning; but, in judging of the quality of bricks by this method, care should be taken to remove any sandy material that may adhere to the surface, and which may have been used in the moulding, and subsequently, to prevent the clay from adhering to its supports during drying and burning. Perhaps the most severe test to which a brick may be subjected, is to make it red hot, and then to drop it into a bucket of cold water; if it survives this ordeal there is not much the matter with it.

NUISANCES IN BRICK-BURNING.

The police magistrate and higher functionaries of the judicial bench are frequently required to settle disputes and to enforce the law with reference to public nuisances arising from the manufacture of bricks. We do not intend to discuss the matter in its legal aspects, but it may be useful to say a few words as to the general sources of origin of the nuisances. In nearly every case brought into court it is proved that the operation of burning the raw materials is responsible for the offensive odours given off, though there can be no doubt that the composition of the earths as made up artificially, prior to moulding, is also answerable therefor. Occasionally, sulphurous smells may arise from the employment of inferior fuel, containing sulphide of iron, but this cause would be comparatively insignificant in its effects, and would rarely lead to the condemnation of the manufacture as a public nuisance. Dense volumes of smoke issuing from open kilns or due to clamp burning, during the first few hours after the fires have been lighted, have sometimes been cited as prime factors in the nuisance, but legislation in recent years has led considerably to abatement on this head in the neighbourhood of towns, where the complaints have chiefly been made. Nevertheless, there is much room for improvement in that direction, as, indeed, in smoke-abatement generally.

The trouble caused by smoke alone, however, pales into insignificance before that due to the composition of the earths burnt. These latter in their worst forms may be divided into two groups: (1) Natural clays, containing much iron pyrites and carbonaceous matter, and (2) Town refuse held together by a cement of clay. These two categories trespass on each other, some of the latter material, in greater or less degree, being mixed with the former. Of the first group, it is possible to abate the nuisance caused by abstracting the iron pyrites. That mineral, of high specific gravity, and usually occurs in solid lumps, so that by a simple process of levigation it can be readily removed from the clay where any trouble at all is taken in the preparation of the raw earths. A brick manufacturer can have no excuse to offer for allowing a nuisance due to this cause to exist. It is amusing to note the defence usually set up in such cases, which is that the brick-earth employed is of the "ordinary kind," and that the maker cannot be held responsible for the composition of natural clays.

Where the clay is artificially mixed with chalk, evolution of carbonic acid takes place on burning, owing to the more or less complete calcination of

the carbonate of lime. This nuisance could be removed by the addition of lime only, instead of carbonate of lime, which would also improve the character of the bricks. If natural marl is used, the only way is to arrange for the consumption of the smoke, &c., arising from the kiln—not always an easy matter.

The greatest nuisances from brick-burning come from the employment of the second group of earths mentioned—those made almost exclusively of town refuse and impure earths. The only way to prevent these annoyances is to compulsorily close the works. It is often difficult to arrive at their true nature, however. Evidence in such cases is that a certain amount of "breeze" is added to the raw brick-earths to more effectually burn them, then it is stated by witnesses that "breeze" is employed for a similar purpose in practically all brickyards in the neighbourhood of London; further that the nuisance complained of does not exist, "therefore" the prosecution, or the pursuer for an injunction, must fail. The prosecution, on the other hand, although bringing forth witnesses to prove the existence of odours, in most instances neglects to show whether they are injurious to health or not, and there is generally an absence of expert opinion as to the composition of the moulded bricks before they are burnt. What is wanted in such cases is definite information concerning the character of the breeze; all other matters are secondary to this. Breeze may consist of chinders, coke, or small coal, when any nuisance arising could not be due to the mixture of the material with the clay; it is different, however, when the breeze is compounded of bones, rags, cork, decaying vegetable matter, &c.

The brick-burning nuisance, so loudly complained of in the outskirts of London, could be almost entirely removed, other considerations apart, by the compulsory adoption of one or other of the patent brick kilns which consumes its own smoke and delivers the gases and vapours produced into the atmosphere at the height of, say, about 150 ft. from the surface of the ground. So long as open-kiln firing is permissible, and no control is exercised over the character of the breeze employed, the nuisance is bound to exist. The product of refuse-destructors, if it does not become too valuable for the purpose, might be used in greater quantity than it is at present in the manufacture of bricks. When we learn that certain vestries are making, or are about to make, paving-stones of that refuse, and of a quality that "eclipses all other kinds of pavement," we shall not be surprised if London brickmakers find it increasingly difficult to obtain that class of breeze in the future.

Bacteria in Bricks.

Micro-organisms are credited with doing and undoing so many things now-a-days that it is not remarkable that bricks, terra-cotta, and earthenware generally, should have been found recently to contain large colonies, which are stated to lead to the ultimate decay of the materials. We have read some evidence on this matter, and whilst there seems to be no doubt of the capability of bacteria to live and thrive in bricks, we are not convinced that they are important factors in promoting decay in that connexion. Still, it may be interesting to give a few particulars as laid down by the *Wiener Allgemeine Bauzeitung* in 1884, just after the discovery had been made by M. Parize. After alluding to the causes usually attributed to the decay of bricks, such as the development of crumbly and powdery earth on their surfaces, due to deleterious influences of the weather, M. Parize states that these latter are wholly insufficient to account for all the facts of the case. Whilst examining a brick party-wall which was slightly damp, he observed some blister-like patches on several parts of the thin plaster, by which the brickwork was covered. On piercing one of these, very fine red dust escaped, which, on a microscopic examination, was found to contain amorphous mineral matter and other substances, but also an immense number of extremely active organisms. Thinking, possibly, that the occurrence was merely of a superficial character, he carefully removed the thin layer, together with the decomposed surface of the brick, and piercing the brick to the centre, where it was of usual hardness and well burnt, obtained a sample of powder made during the operation, from that point. Here the same kinds of organisms as were proved at the surface, presented themselves, though not in the same quantity, there being only 100 living organisms per square centimetre of the preparation instead of 150. All bricks taken from the wall in question displayed the same appearances, both internally and externally. From the description it would appear

that the experiments were carried out with due care, though the results are rather loosely given.

We should like to have the results of examinations of a similar kind on other bricks, however, than those obtained from a damp wall. The power of penetration possessed by micro-organisms in these cases must of necessity run *pari passu* with the relative porosity of the bricks concerned; with a non-porous brick, it is inconceivable that any damage can be done to it by bacteria. Even where the porosity of the brick is such as to permit the ready penetration and growth of this life it is difficult to see what change could be wrought thereby that could be charged with promoting the decay of the substance of the material. Is it contended that the organisms resist on the highly metamorphosed mineral matter? We do not think for a moment that such contention could be sustained. Or, is it reasonable to suppose that the decay of the bacteria themselves creates destructive organic acids? We think not. That such acids may be made in such manner goes without saying.—M. Julien, of New York, proved that years ago; but, active as these acids undoubtedly are, they are unable to produce any appreciable effect even when manufactured by Nature in large quantities, on the durability of the average brick; we have seen that already, in connexion with the growth of all vegetation in mortar, &c. How much less, then, would they be capable of doing injury to the brick when made only in such minute quantities as could arise from the decay of bacteria in the interior of bricks?

Indirectly, however, the researches of M. Julien possess considerable interest in connexion with hospital buildings. Every one knows of the propagation of disease through the medium of walls in hospitals, and of the precautions taken to prevent the same. And nobody doubts, since the pathogenic nature of many micro-organisms is now well-established, that non-porous walls are best under the circumstances. At few, perhaps, were willing to concede that bacteria were to be found in the interior of bricks to the extent proved by the Continental experimenter alluded to. Medical authorities have already given us a great deal of information as to the special facilities afforded to the penetration of hospital walls of disease germs. Except in very few instances the remedies have hitherto been confined, however, to the application of lime substance, or chemical compound, to the internal walls of the building. Clearly, bricks, being strictly non-porous, should not be used in hospital construction at all. Neither is building of any kind except, perhaps, the harder varieties of granite, suitable, from a medical point of view.

This opens up a question, full of interest, as to whether sewers should be constructed of brick, or porous earthenware of any description. We are not of those who are scared by the thought of bacteria being omnipresent, but precautions could at any rate be taken to prevent the effectual growth of these organisms in situations which might reasonably be supposed to be specially favourable to their appearance in pathogenic form in large quantities; and in no place could they be imagined to exist or to thrive more successfully than in the public sewer. The last statement is due to the argument that pathogenic forms frequently succumb to the superior growth and influence of harmless bacteria in sewers; but that obviously depends on the length of the sewer, the relative rapidity of the fall of the fecal matter, the distance between the point of ingress of the harmful microphytes in question and the sewer fall. In any case, it cannot be held distinctly off from a sanitary point of view to construct sewers of brick, &c., after what has just been said, especially where the material is as porous as is the average brick of commerce. In our experiments the relative porosity of several kinds of bricks, any of the results given will prove serviceable in this direction.

Smoke-stained Bricks.

In the days when bricks from old buildings were put to higher uses than they are at present, complaints were frequently made that smoke-stained bricks—stained through having originally formed part of the internal construction of a chimney—built into the drawing-room wall, lined the plastering and wall-paper also. If plastering were pulled down and more put up in its place, the same thing happened, and so on, indefinitely. We very rarely hear of difficulties that head now, but the question is frequently put in us in modified form, especially with reference to country buildings. The point is, at an inexpensive process may be adopted to

prevent the internal plaster and wall-paper from becoming so disfigured from the cause mentioned. Many cheap remedies have been suggested, and the following appear to be successful. The bricks affected may have their outward surfaces chiselled off for about a quarter of an inch, even though they be stained right through. A thick rough coat of well-haired render or mortar is next laid on and allowed to become thoroughly dry, when a second but finer coat of the same materials is applied. The third and extremely fine and thin coat is affixed before the second is quite dry, and the surface thus formed is whitewashed. Another method is to attach slate, thin sheet-lead, or tin-foil to the bricks, laying on the plaster over them. The same results can, of course, be arrived at by more expensive processes.

OBITUARY.

MR. JAMES WILKINS.—Mr. James Wilkins, who has just died at his residence, Hurle-crescent, Clifton, at the age of 60, was the elder son of the late Mr. Robert Wilkins, the founder of the firm of R. Wilkins & Sons, builders, with whom, in conjunction with his brother, Mr. George Wilkins, the deceased for many years carried on business. Mr. James Wilkins severed his connexion with the firm about ten or twelve years ago, before the death of his father, and carried on business on his own account in Ashley-road, and he retired only a few months ago. Amongst the local works in the erection of which he took part were the Children's Hospital, the Bristol Grammar School, the removal of St. Werburgh's Church from the city and its re-erection on its present site near Mina-road; St. Nathaniel's Church, and the additions to Christ Church, Clifton. The original firm founded by his father gave rise to no less than five firms of builders in the city.

MR. F. THURPP.—At Thurlow, his residence in Thurlow Park, Torquay, Mr. Frederick Thrupp, sculptor, died on the 21st ult., aged 82 years. He was born at Paddington Green, and for the greater part of his life lived and worked in the Metropolis. For very many years Mr. Thrupp exhibited regularly at the Academy. Wordsworth's monument in Westminster Abbey, and that to Sir Fowell Buxton, also in the Abbey, are the work of Mr. Thrupp; while two or three of his figures are in the Mansion House. The monument to Lady Coleridge, in Ottery St. Mary Church, was executed by him, and among other of his public works are the re-erecting of St. Clement's Church, representing the Last Supper, and the monument of Canon Pearson in Sonning Church, near Reading.

GENERAL BUILDING NEWS.

NEW DINING HALL, &c., JAM WORKS, AINTREE.—Large dining halls are being erected for the accommodation of the men and women employed in these works. During the season as many as 3,000 meals per day have to be provided. The women's dining hall is 82 ft. by 48 ft., and is so arranged that it can be easily converted into an assembly hall. The men's dining-room is 27 ft. by 18 ft. The kitchen is 42 ft. by 27 ft. The kitchen is lined inside with glazed bricks, and the dining halls will have a balustrade 6 ft. high, from the works of Messrs. Craven, Dunnill & Co. The exterior is faced with Blackburn pressed bricks, with Yorkshire stone dressings, and the roofs will be covered with Edwards' red tiles. Messrs. Moore, Bros., of Lawtensall, are the principal contractors, and the ventilation and heating works are being carried out on the mechanical system by Mr. William Key, of Glasgow. The architect is Mr. Fred. W. Dixon, of Manchester and Oldham.

BAPTIST SCHOOL-CHAPEL, HORFIELD, GLOUCESTERSHIRE.—The memorial-stones of the new Baptist school-chapel at Horfield were laid on the 27th ult. The school will be completed forthwith, and will accommodate 500 scholars and 800 worshippers. The walls are to be of Pennant stone with Bath facings, and the fittings of the interior will be of pitch-pine. The schoolroom is to be divided into class-rooms by means of folding partitions of pitch-pine. The roof will be of open timber to about half the pitch, and the windows will be of cathedral tinted-glass in ornamental design, and the floors of wood-blocks on concrete. The architect is Mr. H. J. Jones, and the work, which is estimated at 2,074*l.*, will be done by Messrs. R. Wilkins & Sons, builders.

SCHOOLROOMS, EXETER.—The new schoolrooms in connexion with Providence Chapel, Exeter, were opened on the 1st inst. The new halls and schools, which are constructed externally of white facing bricks with Bath-stone dressings, comprise a lecture hall, with open timber roof, measuring 40 ft. by 30 ft., three alcoves, two 20 ft. by 12 ft., and one 28 ft. by 6 ft., with movable platform, and the whole place will accommodate about 450 people. Around the hall several class-rooms are arranged. There are four entrances, two being from Northenhay-street, and two from Maddock's-row. The architect

was Mr. W. S. Croote, and the builder, Mr. G. Herbert.

SCHOOL BUILDINGS, MORLEY.—The new premises of the Morley Friends' Adult School, situate in Ackroyd-street, were opened on the 30th ult., by Mr. John Whiting, of Leeds. The principal entrance is in Ackroyd-street, and stone staircases adjoining the entrances at each end of the building provide access to the large hall or assembly-room on the upper floor, which is 50 ft. long and 30 ft. wide, and is provided with a raised platform at the further end, with an arched recess. A serving-room, with a lift communicating with the kitchen for school teas, and a committee-room, are situated in close proximity to the platform end of the hall. The accommodation on the ground floor comprises a library and reading-room, 28 ft. in length; a meeting-room for mothers' and sewing-meetings, 26 ft. long by 14 ft. 6 in. wide; and four class-rooms, with fixed seating of Oregon pine. The kitchen for school teas is also provided on this floor. The building is faced with stone and roofed with Bangor slates. It has been carried out from the designs and under the superintendence of Mr. William H. Thorp, of Leeds.

CHOIR STALLS, OTLEY PARISH CHURCH.—Recently a choir-screen was erected in All Saints' Church, Otley, to the memory of the late Mrs. Fison, of Greenholme, and still more recently, Mr. F. Garnett, of Moorville, Burley, Woodhead, has presented to the church a set of choir stalls, which has just been dedicated by the Archdeacon of Ripon. The new stalls, which are designed to be in keeping with the new chancel-screen, provide accommodation for twenty-seven men, and twenty-four boys. The principal features of the stalls are the tracery and carved open-work fronts, and the massive ends, finished with carved poppy heads and sunk tracery work. The carving is the work of Mr. W. Clayton, of London. The stalls themselves are the work of Mr. Taylor, of Yeadon, who also made the adjoining screen.

FOREIGN AND COLONIAL.

FRANCE.—M. Henri Roujon, Directeur des Beaux-Arts, is to visit London shortly for a few weeks to study the organisation of English museums.—The Comte de Susor, Architect-in-Chief to the city of St. Petersburg, has been appointed a corresponding member of the Académie des Beaux-Arts, in the section of Architecture.—The Senate has authorised the erection of a bust of Henri Mürger in the garden of the Luxembourg, in the vicinity of the Odéon.—The Parliamentary Committee charged with the reorganisation of the Service des Bâtimens Civils has decided on attaching that service to the Department of Fine Arts.—The Municipal Council of Paris has authorised the formation of a siphon under the Seine, at the Pont de la Concorde, and the construction of a large collecting sewer at Clichy, in the exterior section of the fortifications. This work, which will cost nearly three million francs, is to be entrusted to M. Berlier, the engineer who carried out the siphon at Asnières.—The Nord Railway Company proposes to establish a new railway station in the neighbourhood of the Faubourg St. Denis, which will serve as a terminal station for suburban trains.—A bust of the sculptor Pierre Puget is to be inaugurated at Toulon.—It is announced that a monument is to be erected at Vaulx to "Laure de Naves," better known as Petrarch's Laura.—The Narbonne Fine Art Society is opening its second exhibition on May 19th.—The monument to Théodore de Banville at Moulins is to be inaugurated in August next.

MISCELLANEOUS.

GOOD FRIDAY WEEK.—Next week we go to press a day earlier than usual. All communications for the Editor should reach him by *first post on Wednesday morning*, except lists of tenders, which will be received up to 10 a.m. of the same day.

MUNICIPAL BUILDINGS, ABERDEEN.—The erection of the new police offices on the site of the old prison in Lodge-walk, Aberdeen, which will be completed by October next, will allow of the removal thither of the City Police Court-room and of the central accommodation for the City Constabulary. The space in the Municipal Buildings thus vacated will then be available for the Burgh Surveyor's, Public Health, City Tax Office, and Gas Office Departments, which require additional accommodation. The Town Council has resolved that the heads of the different departments should be invited to prepare a statement of the accommodation required by them. Competitive designs for carrying out the alterations are, after this has been adjusted, to be invited from architects practising in Aberdeen, and submitted to a neutral architect, to be afterwards named as arbitrator to decide as to which of the designs best meets the requirements of the case. The author of the design placed first in the order of merit by the arbitrator will be employed as architect for the alterations, upon the usual terms of professional remuneration, and the authors of the designs placed second and third to receive a premium of 30*l.* and 20*l.* respectively. An enlarge-

ment of the Town Hall may be included in the alterations.

ENGINEERING STUDENTS AT PORTSMOUTH DOCKYARD.—About ninety students from the Crystal Palace Company School of Practical Engineering visited the Portsmouth Dockyard on the 29th ult. The students were divided into two parties, the first under the care of the Principal, Mr. J. W. Wilson. This party visited the wood-block-making shop, where the celebrated machinery of the elder Brunel was seen at work. The smitheries were next visited; here the forging of a big davit was witnessed. Another place of interest was the pump-house and the air-compressing chambers. The pump, which lifts eight tons of water at every stroke, was set to work. The gun shop was also visited, after which the principal's party went on board the *Duchess of Albany*, where the students, in parties of three, inspected the engines at work, and obtained data for a paper which will have to be written on the subject. The steamer was then tested over the measured mile, and necessary notes were taken. In the meantime the second party was doing civil engineering work under the conduct of Mr. J. W. Wilson, junr., Vice-Principal. Major Raban, R.E., Superintendent Engineer of the Dockyard, accompanied this party, who visited the dock extension, as well as the new battleship *Prince George*, now being constructed. The Commander of H.M.S. *Revenge* showed the younger Mr. Wilson's party all over his vessel, and explained everything of interest to his visitors.

ORGAN FRONT, CHURCH OF ST. MARYCHURCH, NEAR TORQUAY.—There has just been added to the parish church of St. Marychurch, near Torquay, an ornamental front to the organ and its pipes, which occupy the north side of the chancel. The case is of carved and traceried English oak, designed by Mr. George H. Fellowes-Prynn, architect, and made in the studios of Messrs. Harry Hems & Sons.

"NEWSPAPER MAPS" OF AUSTRALIA AND SOUTH AFRICA.—We have received from Messrs. C. Mitchell & Co. two large-scale maps of Australia and South Africa, giving marginal lists of the existing newspapers in those countries, the "newspaper towns" being marked by large asterisks on the maps, which also give railways and steamboat routes. These maps should be very useful to those who have commercial relations with the Australian and South African colonies.

BATH SEWAGE DISPOSAL.—The City Council of Bath have engaged Mr. W. H. Radford, C.E., of Nottingham, to complete his plans of intercepting sewers and sewage disposal works for the city, and to furnish estimates of cost, he having previously been engaged to report on a preliminary scheme and prepare preliminary plans. The population is about 50,000, and the scheme will be a large one with the latest modern improvements.

STRIKE IN THE LEICESTER BUILDING TRADE.—Meetings of both the master builders and the Leicester carpenters and joiners who have come out on strike were held on the 1st inst. At the meeting of the employers it was decided to engage skilled operatives, unionists or non-unionists, at 8½d. per hour—the advanced wage—on one condition, and that was that they should accept the rules which had existed since 1891, until a new code could be settled between the Masters' Association and the Operatives' Society. But as the operatives insisted on the adoption of their new rules *en bloc*, they remained out, and the deadlock continues.

ADMIXTURES IN PORTLAND CEMENT MANUFACTURE.—In a paper read by Mr. D. B. Butler at the Society of Engineers on Monday last, he said, referring to the recent controversy as to adding new materials to the clinker of Portland cement:—"The one material about which the controversy chiefly rages is Kentish rag, a limestone of varying composition found near Maidstone. From samples of cement containing a certain addition of this limestone, which have been sent to the author for testing in the ordinary course, the results by the usual methods of mechanical testing compare favourably with average English cements, even when gauged with three parts of standard sand, though of course what results they would give without the admixture, he has had no opportunity of judging. He has, however, instituted a considerable series of experiments on the subject, extending over a lengthy period, and when these are completed, he will be able to speak more definitely on the matter. The same question of admixtures arose in Germany a few years back, where adulteration was then largely practised, and the results of experiments, carried out under the auspices of the German Cement Makers' Association, seemed to prove that admixtures of any sort detrimentally affected the cement, and, as a consequence, a resolution was passed, by which the members of that Association bound themselves not to use any admixture whatever, an exception being made in the case of gypsum, of which two per cent. was allowed to regulate the time of set. On the other hand, Professor Tetmajer of Zurich obtained very different results from those of the German Association. With certain admixtures he obtained equally good and in some cases better results than with the pure cement. Until, therefore, we have more conclusive independent evidence in their favour, it seems questionable whether admixtures of

any sort are desirable. As, however, such admixtures, and more especially Kentish Rag, are easily detected by analysis, the user, at all events, has it in his power to discriminate between the ordinary calcined product and that containing an admixture.

LEGAL.

PRINSEP v. BELGRAVIA ESTATE, LIMITED.

This was an action by the plaintiff, Lady Prinsep, to restrain the defendants, who were builders, from carrying on their building operations on a plot of land adjoining the plaintiff's dwelling-house in such a manner as to cause loss and damage to the plaintiff under the following circumstances. In the course of their building operations the defendants had, in the month of November last, excavated the plot of land to a considerable, but not to an unusual, depth, in such a manner that the floor of the excavation sloped towards the wall of the plaintiff's house. About that time very heavy falls of rain occurred, with the result that that part of the excavation adjoining the plaintiff's premises was flooded and the water percolated into the basement of the said premises and flooded it to the depth of two or three inches.

The plaintiff alleged that the flooding of her premises was entirely due to the negligence of the defendants in so excavating their plot of land as to make the floor of the excavation slope towards her house, and she sought an injunction to restrain them from continuing to carry on their work in that manner.

The defendants denied negligence on their part, and said that the slope of the floor aforesaid towards the plaintiff's property was the necessary consequence of a cartway they had constructed in order to enable carts to go down into and come out of the excavation. They further alleged that, as the depth of the way was necessary for the proper and effective performance of their building operations. As a matter of fact, the injunction was never granted, the wet weather having passed away, and with it all damage or inconvenience to the plaintiff occasioned thereby.

The case was argued before Mr. Justice Stirling on March 20 and 21, and a view to be decided by the question as to costs, and his Lordship delivered a reserved judgment on March 30. After stating the facts, his Lordship continued:—"I am now asked to dispose of the costs of this action, and in order to do so it is necessary for me to go into the merits of the case. The first question to be considered is what is the principle of law applicable to the case? The plaintiff relied on the case of *Broder v. Saillard* (reported in "Law Reports," 2 Ch. Div. 692), which decided that the occupier of a house is liable for allowing the continuance on his premises of any "artificial" work which causes a nuisance to a neighbour, and she alleged that the defendants had erected an "artificial" erection (i.e., the cartway), and had made an "artificial" excavation on their plot of land.

Now, in my opinion, these operations were not "artificial," but were operations conducted with a view to the natural enjoyment of the land, and nothing more. The land is building land in London, and the operations of the defendants were simply for the purpose of erecting a house thereon, and it does not seem to me that this can be said to constitute an "artificial" state of the land within the meaning of *Rylands v. Fletcher* (reported in "Law Reports," 3 H.L. 330).

His Lordship also referred to *Wilson v. Waddell*, "Law Reports," 2 App. Case, 95, and *West v. Lamb*, land Iron and Steel Company v. Kenyon, "Law Reports," 11 Ch. Div. 782, and continued:—

The landowner will not, of course, escape from liability unless his operations are carried on with care and without negligence, and as I have decided that the defendant's operations were not "artificial" within the meaning of the cases I have already cited, the matter now depends solely on the question of negligence. The affidavits on this point, however, are very contradictory, and I cannot, on the materials before me, come to any definite conclusion. Consequently, the only order I can make is that there should be no costs.

OBSTRUCTION OF LIGHT:

IMPORTANT CASE IN THE CHANCERY DIVISION.

The case of the Kensington Co-Operative Stores, Limited, v. J. Lyons & Co., Limited, which came before Mr. Justice Romer in the Chancery Division the week before last, was concluded on Thursday, the 28th ult., it being an action brought by the plaintiffs for an injunction to restrain the defendants from interfering with the access of light to their windows.

Mr. Neville, Q.C., and Mr. Wagget appeared as counsel for the plaintiffs; and Mr. Levett, Q.C., Mr. de Witt, and Mr. Martelli for the defendants.

From the facts, which were exceedingly complicated, it appeared that the premises in question were situated at West Kensington, and formerly constituted portions of Cadby Hall, occupied by and belonging to Messrs. Woodhouse & Rawson. The two blocks of buildings were exactly similar in height and construction, having a large number

of windows on the sides where they faced each other, across an intervening space of about 33 ft. in width, and the plaintiffs' property included a portion of that space to a distance of 10 ft. or 11 ft. from their wall, the remaining and larger portion of the space belonging to the defendants, there being an iron railing separating the two properties. In September last the defendants erected certain buildings on their portion of the intervening space, and the plaintiffs immediately commenced the present action, on the ground that such buildings interfered with the access of light to some of their windows, which injured their property and seriously interfered with the conduct and success of their business in certain branches. The plaintiffs' title to maintain the action depended on what is legally known as the doctrine of implied grants. It appeared that prior to August, 1892, both blocks of buildings, with the intervening space, belonged to Woodhouse & Rawson, but subject to a legal mortgage. On August 8, 1892, the plaintiffs' block, with their portion of the courtyard, was conveyed to a former company, of whom the plaintiffs are now the successors discharged from the mortgage, the mortgagees joining in the conveyance to convey the legal estate, and receiving the purchase-money in part discharge of their mortgage money. On the same day a mortgage was made in 1893 for the property last conveyed, and by another deed in which the before-mentioned conveyance was recited the remainder of the mortgage debt and the premises which now constitute the defendant's property were transferred and conveyed to a Mr. Hibbert. The company who were the purchasers in 1892 went into liquidation in 1893 for the purposes of reconstruction, and all their property was transferred and conveyed to the present plaintiffs, who by agreement with the mortgagees of August 8, 1892, substituted a new mortgage in fee for that affecting their property when they purchased. The defendants purchased their block and portion of the courtyard in 1893 from Mr. Hibbert, who exercised his power of sale as mortgagee. The defendants, in addition to denying the alleged obstruction of light, disputed the plaintiffs' right to rely upon the grant made in August, 1892. They further alleged that, having regard to some discussion as to building on the courtyard which took place on the granting of a lease of the plaintiffs' premises in 1890, there was evidence to rebut the presumption of grant, in any event.

At the conclusion of the evidence and the arguments of counsel, his Lordship, in giving judgment said that if ever there was a case of grant by implication this was such a case. That being so, the question was, had the defendant's new building substantially interfered with the enjoyment of the light by the plaintiffs? On the evidence he felt no doubt that the new buildings did substantially interfere with the plaintiffs' windows in the basement and ground floor, and in his opinion the injury sustained by the plaintiffs was a very serious one, and great damage would be done to a very important building if the Court disregarded what had been done, or allowed the interference with the light to be continued. The interference being so substantial, the defendant were not entitled to keep their new building standing on simply paying a money compensation to the plaintiffs, and the plaintiffs were entitled to have the defendants' buildings restricted to substantially the state in which they formerly existed. The defendants were not bound to pull down the whole of the new buildings, but the buildings would not be allowed to stand in such a condition as to obstruct the plaintiffs' light. The plaintiffs were entitled to an injunction to restrain the defendants from permitting to remain or erecting any wall or building on the north side of the plaintiffs' building, so as to interfere with the access of light to the plaintiffs' windows in the north and north-east walls on their basement and ground-floor as such light existed in August, 1892. His Lordship also directed that there should be an inquiry as to the damages the plaintiffs had sustained in the meantime, and ordered the defendants to pay the costs of the action. The costs of the inquiry he reserved.

CLAIM FOR AN INJUNCTION:

TO RESTRAIN THE PULLING DOWN OF A HOUSE.

The case of *Horton v. the Aston Local Board* came before Mr. Baron Pollock in the Queen's Bench Division on Tuesday.

Mr. Jelf, Q.C., and Mr. Arthur Young appeared as counsel for the plaintiff; and Mr. Lawrence and Mr. Vachell for the defendants.

The case came before the Birmingham Assizes last year, but as two of the main points were not sufficiently developed in the pleadings with his Lordship's permission it was adjourned to the plaintiff's expense to allow the pleadings to be amended. The action was for an injunction to restrain the defendants from pulling down a house in a certain road at Aston, which they had passed resolution to pull down. The plaintiff's case was that the defendants were not in a position to do this because they were bound by contract made for good consideration to give consent to the building of a house in the way in which it was built over a certain

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The Builder.

VOL. LXVIII. No. 273

April 13, 1895.

ILLUSTRATIONS.

Isaak Walton Memorial Window, St. Dunstan-in-the-West.—By Messrs. Percy Bacon & Bros.	Double-Page Ink-Photo.
Competition Design for Proposed Bank, Halifax.—By Herbert Atthorn	Double-Page Photo-Litho.
Mansions opposite the British Museum.—Mr. C. F. Hayward, F.R.I.B.A., Architect	Double-Page Ink-Photo.
"Abbot's Leigh," near Hayward's Heath.—Mr. F. C. Lees, Architect	Single-Page Photo-Litho.
A House at Rudgwick, Sussex.—Mr. W. H. Harrison, Architect	Single-Page Photo-Litho.

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Bath Stone.



THE literature relating to Bath stone is a large one, but it, for the most part, consists of (1) information derived second-hand from persons interested in the material from a commercial point of view; (2) articles resulting from a personal visit to two or three quarries only by those who, judging from their remarks, were too much struck by the beauty of the surroundings to pay any attention to their practical aspects, and whose writings, even in journals devoted to building, are mere eulogisms of the proprietor of the quarry, of the "mighty Titans" of the ground, and the fungi on the wooden pillars, not unmingled with expressions of grief after being below for a few hours at the more finding themselves in the open; (3) pseudo-scientific observations based only on reports referring to the stone as carried between fifty and sixty years ago published in the "Report with reference to the Selection of Stone for building the new Houses of Parliament (1839)"; (4) out-of-date stone merchants' circulars; (5) essays by geologists acquainted with the qualifications of the stone for building purposes and written from a purely scientific standpoint, useful enough in their own sphere, but of no value to the architect; and (6) "crushing weights," coefficients of elasticity, ratios of absorption, specific gravities and chemical analyses made by very competent men, but on specimens of the stone "kindly" sent to them by stone merchants.

The result of all this is that in spite of the fact that no building-stone in the United Kingdom is used so extensively as that from the neighbourhood of Bath, the material is imperfectly understood by the architectural profession. Probably no stone ever had been subjected to such sweeping and severe criticisms in regard to its quality, it would be difficult to find one which thrived so well on them. It has always been regarded as the "jerry" builders' stone of excellence, cheap, easily toolled, effective; yet how little does some of it deserve the opprobrium. That there is bad and

worthless Bath-stone, and that it is used in immense quantities, we freely admit; but precisely the same might be said of almost any other kind raised over such a wide area. Indeed, it would be very remarkable were this not the case, for a stone of uniformly good quality over several square miles of area is unknown in Nature. To a certain extent the discredit attaching to it is due to the several quarry-masters concerned, who, in times gone by, made no sufficient distinction between the several kinds, so that varieties raised many miles from the city, and which ought to be known by other local names, are all denominated "Bath stone." The indiscriminate manner in which the stone from widely-separated areas was generally supplied for the erection of a single building could not but mislead architects as to the nature of the material for specific purposes. At the same time, we cannot shut our eyes to the fact that architects, as a body, have taken no pains whatever to discover the real sources of origin of the divers kinds, and have not exercised much discretion in their selection. So long as this apathy exists we cannot hope for improvement. We go so far as to say that barely one architect in fifty, having ordered a certain kind of Bath stone, ever knows whether he gets that, or some other kind. It is all very well to state that the material has been ordered from a reliable firm; we do not desire for a single moment to cast any aspersions on Bath stone merchants, or their agents, as a class—we would say the same of those dealing in any other kind of stone; the architect should, on general grounds, be in a position to distinguish the material he orders. The genuine quarry master whose invoice faithfully records the class of stone sent does not fear an inquiry; he knows of the existence of agents, and those hanging on the fringe of the trade, who do not scruple to sell their stone under any name convenient for the moment—he is only too glad to assist in unearthing them.*

The following observations are the result of an exhaustive inquiry on the spot, supplemented by research in the laboratory. Save

* At one quarry in the Bath area, in answer to an inquiry as to what the stone raised there was usually called in the market, we were informed—"Anything; all Bath stones are so much alike that architects cannot tell one from another. We have sometimes called it Portland when builders require that stone."

in a few unimportant cases we have visited every quarry, to the number of forty-eight, in the district. In most instances the thicknesses of the various beds were measured, whilst seventy-three samples of stone were collected for future study. Of these latter, fifty have been selected for detailed experiment, in order to ascertain certain physical properties having a practical bearing from the architect's point of view, and fifty-two thin sections were cut therefrom for examination under the microscope, as described on a former occasion.

The Stone-Producing Areas.

The large district drawn upon in exploiting Bath stone may be judged from the accompanying sketch-map (fig. 1), for the particulars on which we are entirely responsible, except in so far as the geological boundary-lines and railways are concerned. These latter are inserted from the official geological map of the district. The position of each quarry (in the sense presently to be defined) is marked thereon, from our own observations. It will be noticed that the workings are situated near Corsham, and between that village and Box, at Hartham Park, Monk's Park, Kingsdown, Monkton Farleigh, Bradford-on-Avon, Westwood, Winsley, Limpley Stoke, Bathampton, Coombe Down, and Odd Down. The most important local areas are the Box-Corsham, Monk's Park, and Farleigh groups. The Monk's Park and Hartham quarries are farthest from Bath, being about nine miles distant to the north-east; those at Bradford-on-Avon and Westwood are about six miles from the city in a south-easterly direction. It is noteworthy that no large workings are open to the north of the London railway line, except in the Box-Corsham-Hartham areas; and none are found to the west of Bath. The whole of the stone-producing areas may be divided into two parts: one to the south, south-east, and east of Bath, occupying an area of about sixteen square miles; the other, to the north-east, having an area of about nine square miles; so that Bath stone is raised over a district comprised within twenty-five square miles.

Geological Position.

A glance at the map (fig. 1) suffices to show that all the quarries are situated in the geological formation known as the Great or Bath Oolite, a member of the Jurassic series which also yields good building-stones in the southern part of the Cotswolds, to the

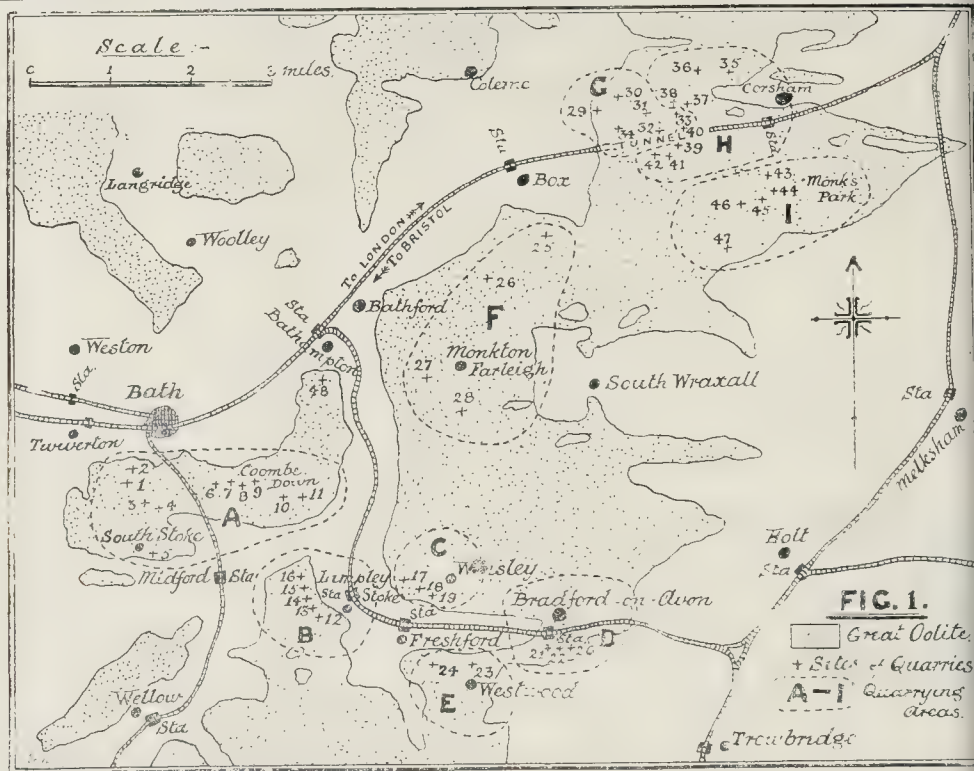


FIG. 1.—Map showing the Stone-Producing Areas, and Sites of all Bath Stone Quarries.

north of the area depicted on the map. It will also be noticed that enormous outcrops of that formation occur, on which no important quarries are situated. On the main mass, north of Bradford-on-Avon, and beyond South Wraxhall, it seems tolerably clear that enormous quantities of stone exist. On the hills to the south of Limply Stoke, the formation is also well represented. The large tracts to the north, near Langridge and Colerne, however, would have to be studied in more minute detail than has hitherto been done to prove the existence of anything like extensive beds of good building-stone there. It may be taken for granted that there is enough stone "in sight" at the various quarries to last for many years to come, and there is nothing from a geological point of view, likely to arise to interfere with the workings. The sites for new quarries will have to be largely controlled by the proximity or otherwise of easy carriage.

The Quarries.

For convenience sake we have divided the Bath district into several areas, the designations of which correspond as nearly as may be with the names usually borne by the different kinds of stone in the market. They are indicated on the map (fig. 1), and are as follow:

- A—Bath area (Odd Down and Coombe Down stone).
- B—Limply Stoke area (Stoke ground stone).
- C—Winsley area (Winsley ground stone).
- D—Bradford-on-Avon area.
- E—Westwood area (Westwood ground stone).
- F—Monkton Farleigh area (Farleigh Down stone, Kingsdown).
- G—Box area (Box ground stone).
- H—Corsham area (Corsham Down, Corngrit, and Hartham Park stones).

I—Monk's Park area (Monk's Park, Ridge Corsham, and Park Lane stones).

In going round the workings we were met with a difficulty at the outset as to what should constitute a separate quarry. With the exception of those on Odd Down, the majority on Coombe Down, those at Winsley, and one in the Box area, all the workings are underground, and should therefore be called stone-mines. Many of these mines are close together, and communicate with each other underground. The difficulty was to define the limits of each mine. Nearly all have several distinct headings; a number of these constitute a "quarry." The method we have adopted is to give each quarry or separate mine a distinctive number, and the various headings examined are distinguished by adding a letter. For example, No. 30 denotes the Clift quarry at Box Hill, and points 30^a, 30^b, 30^c, 30^d, 30^e indicate separate headings visited in that quarry.

A.—Bath Area.

Starting from Bath, and passing by a large disused quarry en route, we arrive on Odd Down, at

Quarry No. 1.—An open working showing 6 ft. of overburden and 12 ft. of building stone in eight beds. Sample No. 1 was obtained from the third bed from the top of the latter series; it is of a brownish yellow colour, and composed of fragments of shelly matter and oolitic granules bound together by a hard crystalline matrix, the latter forming a large proportion of the stone. The oolitic granules are not so crystalline as the matrix, and are more absorbent. It would appear as though they were much decomposed, and many are reduced to mere nuclei between which and the matrix is a free, porous space. The vertical joints in the quarry are very irregular, and the stone generally is much broken up, but large blocks are here and there seen. We

observed one which measured 5 ft. 11 in. 3 ft. 3 in. by 2 ft. 11 in. Although raised. Odd Down the material is known in the market as Coombe Down stone.

Quarry No. 2.—A very small open working, not differing materially from No. 1.

Quarry No. 3.—An open working with about 3 ft. of tile-like rubble overbearing and 9 ft. of rather rough-looking stone, with very few regular beds, and much cut up jointing.

Quarry No. 4.—Another small open working with 6 ft. of overburden, and 20 ft. of building-stone running in thick beds. Large blocks were obtainable, but many were much discoloured. There was a small "chilly" penetrating the stone, from the surface of the ground, to which some of the discolouration is due.

Quarry No. 5.—An unimportant working at South Stoke.

Quarry No. 6.—A large open working, Coombe Down, from which enormous quantities of stone were evidently abstracted in former days. It is in the form of a long sinuous wall stretching for several hundred yards. At a point now being worked we measured the following section (fig. 2):—

Sample No. 6, obtained from a point indicated in the above section may be readily distinguished by its lighter tint, somewhat finer grain, more open texture, and by having so much shelly matter. It seems to take a sharp aris. In the quarry it appeared to be clean, and to possess minute cracks filled with calcite, which render it sounder than would otherwise be the case. The so-called "bastard" stone is peculiar; contains what the quarrymen call "cockles"; we examined a number of these, expecting from the description, to find the remains of fossil molluscs, or corals. They were, however, mere cavities, lined in some cases with fine crystals of calcite, and no doubt origi-

ally contained fossils which have since been decomposed, and removed in solution by water. We state this to show the kind of action to which the Coombe Down stone has been subjected, by which its original

FIG. 2.

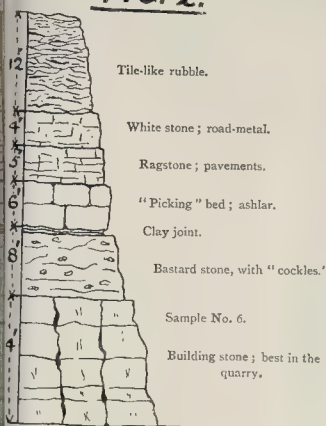


FIG. 2.—Section in a Quarry on Coombe Down, near Bath.

character has become much modified. Continuing along the face of this quarry we noticed a species of wedge-bedding, a phenomenon illustrated in fig. 5, though the latter refers to another working. We ascertained that the false-bedding, or wedge-bedding did not affect the quality of the one in any way.

Quarry No. 7.—An open working known as Prior Park quarry, consisting of 8 ft. of rubble, 8 ft. of useless stone in four beds, two of which are much iron-stained, beneath which is a variable thickness of building stone, from 4 ft. to 7 ft. deep. The quality of the stone is not bad, but the joints are rather close together, and only small blocks could be obtained at the time of our visit. The lower portion is slightly false-bedded. The one is of a yellowish-brown tint, compact, with many shells, and several earthy oolitic granules.

Quarry No. 8.—Small open working, with 10 ft. of overburden, and 7 ft. of building-stone. The latter are in very thin beds, six being disposed, vertical joints irregular, so that only small blocks were procurable. It is lighter tint than that from No. 7 quarry, and contains a number of small porous cavities, which immediately distinguishes it from the others.

Quarry No. 9.—An open working, with 3 ft. of overburden, and 10 ft. to 11 ft. of building-stone, in rather thick beds for Coombe Down. One measured 2 ft. 9 in. on the bed. It is much used as sawn ashlar, and the blocks present a peculiar appearance. Over the face of the stone, as will be seen in the following sketch (fig. 3), a number of veins

FIG. 3.

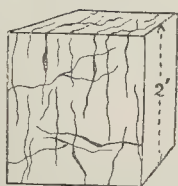


FIG. 3.—Block of Coombe Down stone, showing minute calcite veins.

calcite make their appearance. The width of some of these was as much as 1 mm., and using a lens, extremely minute ones, and

very close together, were observable. This structure is peculiar to certain kinds of Bath stone, and although they must be, to some extent, a hindrance to the free working, or masoning of the material, they will be found to be characteristic of the most durable varieties.

Quarry No. 10.—A large open working, known as Mount Pleasant quarry, with a considerable thickness of overburden, made up of 16 ft. of tile-like rubble with coarse stone at the base, underneath which is a bed of ragstone 7 ft. in thickness; then follows the building-stone in beds of 4 ft. 6 in., 2 ft. 6 in., 4 ft., 10 in., 11 in., and 9 in. The stone is finely oolitic and shelly, with a hard crystalline matrix, but its most durable part is the shell constituent. Thin calcite veins are frequent.

Quarry No. 11.—Part of this working is in the open, and part underground; it is the only stone mine on Coombe Down. The section in the heading showed four beds, having the following thicknesses respectively: 3 ft., 3 ft. 6 in., 4 ft. 6 in., and 2 ft. 6 in. The stone is fine-grained, and mainly composed of minute oolitic granules.

B.—Limpley Stoke Area.

All the workings in this area are mines. They are situated near the summit of a hill above the village of Limpley Stoke, the material for the most part being carted to the railway station near at hand. All the sections visited showed but one bed of building-stone, known in the market as "Stoke Ground."

Quarry No. 12.—Thickness of bed 5 ft. 9 in.* The stone is of a brownish cream tint, medium-fine grain, not very uniform, and compact. It is composed of rather earthy oolitic granules, with occasional large pieces of shells bound together by an abundant calcite matrix. The last-mentioned is the most characteristic and distinguishing feature in the Stoke ground stones, which are all very homogeneous in tint and appearance.

Quarry No. 13.—The section here shows a bed 6 ft. 3 in.* in thickness. The oolitic granules are slightly more earthy.

Quarry No. 14.—This communicates underground with the last-mentioned working. The building-stone bed is 7 ft. 6 in.* in thickness. It is locally harder than any other in the area, a phenomenon produced by the occurrence of small concretionary patches, in the vicinity of which the whole stone seems to be better in quality than elsewhere. It is probably the most durable of the stones in the Stoke area. In walking underground we noticed two faults which seem to have been a considerable hindrance in the working. The following diagram (fig. 4) shows the effect. A section of the

FIG. 4.

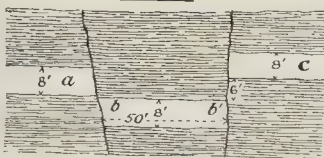


FIG. 4.—Section in Quarry No. 14, showing faults.

a, b, c = Galleries from which stone has been removed.

stone, at b, about 50 ft. in length, after having been dislocated has dropped about 8 ft. from the gallery at a, whilst the continuation at c has been elevated about 6 ft., at least, that is the net result of the movement. It was not difficult for the quarrymen in a to find b, but it must have required some tact, after arriving at the wall b, where the stone suddenly gave out, to ascertain the whereabouts of the continuation at c. They were, no doubt, facilitated by the soft ferruginous earth filling up the fault,

* An asterisk following the thickness of a bed denotes that a sample which may, or may not, be described, although carefully examined, was obtained from that bed.

which permitted of tolerably easy access in either direction.

Quarry No. 15.—Situated farther along underground, in a lateral prolongation of the faulted mass b, shown in fig. 4. The stone is 8 ft.* in thickness, and does not differ materially from that last described, except that the small concretions are missing.

Quarry No. 16.—Thickness of bed, 7 ft. 6 in.*; stone similar to that from last quarry. At the point of junction with the bed below (not used) numerous small cavities exist, doubtless due to the action of percolating water.

C.—Winsley Area.

This is the least important of the stone-quarrying areas in the Bath district. Were it not that the material raised is warmer in tint than other kinds, and that certain architects have a preference for it in consequence, it is probable that the quarries would be closed. The amount of overburden to be removed before the stone is obtainable, together with the circumstance that the workable beds are only about 5 ft. to 6 ft. in thickness, render the exploitation of the "Winsley Ground" stone a rather costly affair, and this is no doubt responsible for its being so little used. Yet in former times enormous quantities must have been raised thereabouts, and many buildings erected of Bath stone from fifty to a hundred years since derived the material from the old Murhill quarries, a visit to which is instructive as showing old methods of working.

Quarry No. 17.—The old Murhill workings referred to. The quarries, which form a long open face, have about 20 ft. of overburden, beneath which are two beds of building-stone, 3 ft. and 2 ft. in thickness respectively. The face is interesting as showing the old method of quarrying with picks, instead of one-handed saws. The material appears to have been mostly sent away by canal, for the remains of old-fashioned rails down an inclined plane to the waterway which runs along the side of the hill, may yet be seen. Hard by is a small abandoned stone mine, at a lower level.

Quarry No. 18.—A small open working, showing 20 ft. of overburden, mainly composed of rubble, brown clay, and ragstone, beneath which are two beds of freestone 3 ft. 5 in.* and 2 ft. in thickness respectively. The stone, both in this and the next quarry to be described, was much iron-stained, and appeared to require careful selection. It is a yellowish-brown, fine-grained shelly oolite, the granules being the least crystalline portion of the stone. Its deep colour at once distinguishes it from other Bath stones.

Quarry No. 19.—Very close to the last-mentioned, and the section and stone are similar. The ragstone has many "cockles" and cavities in it, and might do for burning into lime.

D.—Bradford-on-Avon Area.

Although raised in larger quantities than at Winsley, the stone is of more interest locally than from a general standpoint, inasmuch as it is chiefly used in the immediate vicinity of the town.

Quarry No. 20.—This is the largest working in the area, and is known as Woodside quarry, close to the canal. The freestone beds are of variable thickness, measuring in the aggregate from 10 ft. to 15 ft., the roof and floor being of ragstone. The material itself is a light cream-coloured oolite, uniform in grain, and not very fossiliferous.

Quarries Nos. 21 and 22.—Mines known as Poulton quarries, both very small, the material being used locally.

E.—Westwood Area.

The workings in this area are mines of great size. In some respects the disposition of the stone is very remarkable. One may walk for long distances underground and find that the stone does not vary more than an inch or two in thickness the whole way. With few exceptions, presently to be noted,

it is in one bed only, which is about 8 ft. in thickness, but occasionally it "heaves" in the middle—i.e., a weak plane is developed along which the stone has a tendency to split. The most curious point, however, is that the vertical joints are very far apart—in some instances 20 yds. to 25 yds. We were told, and are quite prepared to believe it, that in these quarries gangs of men work for months on one large block of stone before coming upon any joints. The softness of the material in the quarry enables it to be readily cut, otherwise the absence of joints would render it very difficult to get.

Quarry No. 23.—We visited ten headings, but as each one showed a thickness of stone of 8 ft., and were similar in other respects, they need not be separately referred to. In one part of the quarry the freestone was 7 ft. 6 in. in thickness, resting on a hard bed containing blocks sometimes sawn into slabs for paving purposes. This latter stone cannot, of course, be considered in the same light as the freestone.

Quarry No. 24.—Known, like the preceding, as Westwood quarry, and adjoining it. It is a very large quarry. Amongst the headings visited we noticed three, in which the stone was—point 24^a, 7 ft. in thickness; point 24^b, 5 ft. and 3 ft. 6 in.; and point 24^c, 6 ft. and 3 ft. 6 in. One of the peculiarities noted was that no matter in what direction one penetrated from the entrance, it was very wet for a certain distance, and then the galleries became suddenly dry. The Great Oolite formation at this spot is partly covered by clay, which prevents the free percolation of water, so that where the oolite is protected by the clay the ground is dry. This is an interesting fact, amongst many others, gleaned during this visit from the point of view of water-supply. In some of the quarries we were able to ascertain the rate of percolation from the surface, the results being of much use in another connexion. The "Westwood Ground" stone itself may be described as a shelly oolite, in which the shelly constituent is the predominant, and the granules larger than in most other kinds of Bath stone; the matrix is not very crystalline, though abundant.

F.—Monkton Farleigh Area.

The stone mines in this area may be divided into two sections—those near the village of Monkton Farleigh, which are the more important, and those between that place and Box on Kingsdown. Dealing with the latter first, we come to

Quarry No. 25.—Longspitt quarry, Kingsdown. It is a mine showing a great thickness of stone at the headings, cut up into several beds, in descending order as follows: Useless stone, 2 ft.; soft, fine-grained oolite, 1 ft. 6 in. and 1 ft. 6 in.*; "fine-bed," 1 ft. 6 in., 2 ft., 2 ft., and 2 ft. 6 in.; "oaty bed weather" stone, 2 ft.*; "fine-bed" (of the same character as that above the "oaty bed"), 3 ft., 3 ft., and 4 ft. It is difficult to satisfactorily classify any of these beds; some of them partake of the character of Farleigh stone, whilst others remind one of the Box ground. In reality the "fine-beds" constitute a distinct variety of Bath stone. The material is fine-grained, contains an abundant matrix, and although distinctly a shelly oolite, the granules are not very conspicuous unless seen under the microscope. The "oaty" bed contains small local patches of concretionary origin, at which places the stone is much harder than at others.

Quarry No. 26.—Kingsdown quarry, situated about half-way between the Longspitt and Farleigh groups; it is not important. At one point underground (No. 26^a) there were eight beds as follows:—2 ft., 1 ft., 1 ft. 6 in.* 1 ft., 2 ft. 8 in., 2 ft., 2 ft. 2 in., and 3 ft. At the time of our visit the material, much cut up by jointing, was very rough. At another point (26^b) there were nine beds—1 ft. 6 in., 1 ft. 7 in., 1 ft. 8 in., 1 ft. 4 in., 2 ft. 4 in.* 2 ft. 10 in., 1 ft. 4 in., 2 ft. 5 in., and 4 ft. 3 in. Here, also, joints were frequent, but the quality of the stone

did not seem to be impaired. At a third point (26^c) the face of stone was so much cut up, both by bedding and jointing, that it hardly seemed worth working.

Quarry No. 27.—This is by far the most important mine in the Farleigh district, and yields, together with that next to be described, practically all the "Farleigh Down" stone, properly so called. The quarrymasters allude to each heading (or local groups of two or three headings) as a separate quarry, but we have not adopted this course. The stone, as a whole, may be described as being a light cream oolite, fine grained, compact and uniform, shelly matter not being abundant. It is very variable in character at the different headings, and whilst much cannot be said to be of a durable description, yet here and there a fairly good stone is obtainable. A special feature of the bottom beds was the occurrence of large pieces of fossil wood, which we should not notice here, except that they produce soft places, and sometimes holes. In many of the other quarries similar pieces of fossil wood were found, but not in such abundance as in No. 27.

The following headings were visited, and are far removed from one another:—

Point 27^a.—Beds 2 ft. 6 in., 1 ft. 3 in., 1 ft. 7 in., 1 ft. 10 in., 10 in., 1 ft. 6 in.* 1 ft., 1 ft., 1 ft., and 2 ft. 6 in.

Point 27^b.—Beds 2 ft. 6 in., 1 ft. 3 in., 3 ft. 3 in., 1 ft. 3 in., 4 ft.* 3 ft., and 3 ft. 6 in.

Point 27^c.—Beds 2 ft., 1 ft. 8 in., 1 ft. 4 in., 2 ft. 7 in., 2 ft. 2 in., 2 ft. 10 in., 2 ft. 8 in., 2 ft. 10 in., and 5 ft.*

Point 27^d.—Beds 2 ft., 2 ft. 8 in., 3 ft. 4 in., 1 ft. 4 in.* 1 ft., 1 ft. 8 in., and 3 ft. 8 in.

Point 27^e.—Beds 2 ft. 4 in., 1 ft. 10 in., 1 ft. 7 in., 4 ft. 8 in., 4 ft.* and 5 ft.

The 5 ft. bed from which the sample from point 27^e was obtained is of a reddish-brown tint, and is sold for outdoor work more particularly. It is certainly the most durable of the "Farleigh Down" stones. When dry it is not so deeply coloured as that from Winsley.

Quarry No. 28.—South Farleigh quarry. The disposition of the stone underground is rather peculiar; it represents wedge-bedding on a large scale, but the strata are of regular thickness throughout, and present the normal features of dipping. At one heading, point 28^a, the following thicknesses of beds were shown:—2 ft., 1 ft. 9 in., 1 ft. 6 in., 1 ft., 2 ft., 1 ft., 8 in., 2 ft.* 2 ft., 1 ft. 3 in., and 1 ft. 5 in.; at another point, 28^b, they were, 1 ft. 10 in., 1 ft., 1 ft. 2 in., 6 in.* 1 ft. 2 in., 1 ft., 1 ft. 4 in., 1 ft. 8 in., 2 ft., and 2 ft.

G.—Box Area.

The enormous workings between Box Hill and the end of the railway tunnel towards Corsham, form the largest stone mine in the United Kingdom, and probably in the world; they are reached by several entrances. The area occupied is irregularly oval in form, about two miles in length and one mile in width, a system of light railways, and a siding from the G.W.R. at the Corsham end, serving to haul the stone out of the quarries. About two-thirds of this area, towards the west, furnishes the "Box ground" stone; the remaining one-third being exploited for divers kinds of Corsham stone. Outside this immense mine, to the north and south, are other and independent quarries also furnishing Corsham stone. In the maze of galleries and tunnels it is not easy to work out the precise lie of the beds, and so to ascertain the relative positions of the Box ground and Corsham stones, but we offer a solution in the sequel, based on a general survey of the points examined, and are tolerably sure that it is, in the main, correct.

Quarry No. 29.—This is the only open working in the area, and is not important; at the time of our visit it was being converted into a mine. One open face gave the following remarkable detail (fig. 5). We observe that in the upper part of this section the beds are horizontal, under which is a series wedge-bedded, followed by another horizontal parting, the base showing wedge-

bedding in the opposite direction. Underground we measured the following beds:—2 ft. 4 in., 4 ft.* and 4 ft. The stone is of a cream tint with light brown specks, and is of

FIG. 5.



FIG. 5.—Section of open working showing wedge-bedding in two directions, Box Hill.

medium grain. Shelly matter is plentiful, oolitic granules very minute, the crystalline matrix not being abundant.

Quarry No. 30.—Cliff quarry, from the entrance of which the whole of the remaining workings yielding "Box Ground" stone may be reached. It is perhaps the best "show" quarry in the Bath district, the antique and fearful-looking engine running in and out having attracted considerable attention. One may here walk underground for miles, the headings are innumerable, and we elected to examine only a few at sufficient distances apart. It may be worth mentioning, that after a storm on Box Hill, it takes from thirty-six to forty hours for the rain-water to percolate from the surface to the workings underground—a depth of about 110 ft., made up of alternating beds of "rag" and soft stone of no commercial value. Headings yielded the following thicknesses of stone:—

Point 30^a.—Beds 2 ft., 3 ft., 3 ft. 4 in., 2 ft. 4 in., 2 ft., 1 ft. 6 in., and 2 ft. 9 in.

Point 30^b.—Beds 3 ft. 3 in., 3 ft.* 3 ft. 9 in., 2 ft. 3 in., 3 ft., and 3 ft.

Point 30^c.—Beds 5 ft., 3 ft. 4 in., 3 ft. 10 in., 4 ft., and 3 ft. 2 in.

Point 30^d.—Beds 2 ft. 4 in., 3 ft., 5 ft. 2 in., 4 ft., and 1 ft. 10 in.

At the heading point 30^e we saw a block quarried measuring 10 ft. × 4 ft. × 3 ft. 3 in. An old working, known as the "Cathedral" near this point will be adverted to in our remarks on the methods of quarrying the stone in olden times. All we need now say in reference to this is that then the material was obtained from three distinct levels by means of galleries. That quarried from the uppermost gallery was called "Box Scallett" from the middle, "Box Corngrit," and from the lowest level, "Box Ground," which latter is the only variety now exploited.

Quarry No. 31.—Known as "No. 4 Box quarry," from its proximity to shaft no. 4, the "Box tunnel on the Great Western Railway." A heading showed beds as follows:—2 ft., 3 ft. 6 in., 1 ft. 10 in.* 5 ft., and 4 ft. The stone is a rather coarse-grained shelly oolite with sparse crystalline matrix.

Quarry No. 32.—Tynning quarry. A heading gave 2 ft., 2 ft. 6 in., 2 ft. 2 in., 2 ft. 9 in., and 4 ft., as the thickness of beds.

Quarry No. 33.—This, the most easterly of the Box Ground group is called "No. 1 Box" quarry. It is close to those yielding Corsham stone. Two headings examined gave:—Point 33^a, 3 ft. 8 in., 1 ft. 2 in., and 2 ft. 10 in.* and point 33^b, 4 ft.* and 4 ft. 4 in.

Quarry No. 34.—This embraces a number of headings known as the "Lower Hill Boi Quarries," which we did not visit. The stone is practically the same as that from the Cliff quarry near by.

H.—Corsham Area.

The stones obtained from this area following the several varieties, are known by the following names in the market: Corsham, Corsham Down, Corngrit, Hartham Park Corsham, Hartham Park Ground, Scallett, and Corsham Blue.

Quarry No. 35.—This working and the next, known as Hartham No. 2 and No.

aries respectively, are the most northerly the Bath district, and are, to a certain extent, isolated from the main Corsham quarrying area. A number of different kinds of stone are raised, and we think the quarrymen are judicious in giving some of them distinctive names, as in certain respects they are peculiar. There are several headings; a typical one gave the following:—1 ft. 2 ft. 6 in.*; Hartham Park Corsham, 6 in., 1 ft. 6 in., 1 ft. 6 in., 2 ft., and 6 in.*; Hartham Park Ground, 2 ft. 6 in., 6 in.*, 2 ft. 8 in., and 4 ft.—a total thickness of 23 ft. 8 in. The vertical joints are few and far between—some from 30 ft. to 60 ft. apart—though occasionally a "blind" joint running through two or three beds occurs here. Speaking in general terms, these may be classed amongst the older kinds of Corsham stones; the "sallet" bed is a very fine-grained true blue, the Hartham Park Corsham has to a large extent been derived from pre-existing oolites, and has a finely-granular matrix, whilst the Ground stone is characterised by its sparse matrix. They are of a light yellow tint.

Quarry No. 36.—This was not being so fully exploited as the last-mentioned quarry at the time of our visit; the section character of the stone are similar to it. Before stated, it is known as the Hartham Park No. 1 Quarry.

Quarry No. 37.—Opened about 50 years ago, and called Corsham Down Quarry. As stated on the map (Fig. 1), it forms part of the large Box-Corsham Mine. The stone was discovered during the construction of Box Tunnel on the Great Western Railway, and there is a railway siding running through the quarry underground. The workings are divided into two parts, according as they are situated north or south of the railway.

Three kinds of stone are recognised:—(1) Corsham Down "bottom bed"; (2) Corsham Down "fine upper"; and (3) Corsham Down "fine lower." There are sixteen headings, most of which we visited, and measured the following:—Point 37*—"Corsham Down upper," 1 ft. 6 in., 2 ft. 8 in., 1 ft. 8 in., 2 ft. 6 in., and 6 in.*; Corngrit, 2 ft. 6 in.*; and Corsham Down bottom," 4 ft. 6 in.* and 6 in.* The beds in this quarry are arranged as follows, as will be gleaned from the following diagram (fig. 6). Those

FIG. 6.

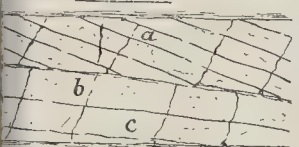


FIG. 6.—Section showing the Disposition of Corsham Stone Beds in Quarry No. 37. a="Corsham upper"; b="Corngrit"; and c="Corsham bottom."

are wedge-bedded, and dip S.E. at the rate of 4 ft. in 17 yards, and rest on a dipping slightly to the south; whilst to a certain extent, follows b. From this it can be perceived that the Corsham Down "fine upper" stone is worked along several headings, as the constantly-recurring beds of the wedge-bedding brings them into the process of quarrying. The dipping is slightly, however, and the stone running chiefly east and west, there are not so many beds as at first sight might be the case. At point 37* the section was seen:—Corsham "upper beds" 1 ft. 7 in.* and 3 ft., and Corngrit 1 ft. 8 in.* This section is north of point 37*, and we notice the beds are much attenuated. Some of the Corngrit occurs in two beds; on going to the south of the tunnel the lower becomes thin and hard—no face, there it is a species of ragstone of no use for building purposes. The term Corngrit is derived from the speckled appearance assumed by

the stone. It is extremely variable in structure, however, and in certain places resembles the Corsham Down beds. On the average it is lighter in colour and harder than they, and the concretionary patches forming the speckles alluded to are very characteristic. Of the Corsham Down beds, there does not seem to be much difference between them, but of the two horizons the upper would, no doubt, prove the more durable. They are true oolites, with very little foreign matter.

Quarry No. 38.—Huddswell quarry, and the stone is known by that name, or as "Corsham." Sections yielded—point 38*, 1 ft. 4 in., 3 ft. 6 in., and 2 ft. 4 in.; the bed below this is a modified Corngrit, 2 ft. in thickness; point 38*, 1 ft. 8 in., 3 ft., 1 ft. 10 in., and 1 ft. 4 in.

Quarry No. 39.—"Stone's No. 6 Corsham"; it is exploited both north and south of the railway tunnel, and is very straggling. The following occurs in the northern portion, point 39*, Corsham stone, 1 ft. 6 in., 2 ft., 2 ft. 10 in., 2 ft. 3 in., and 2 ft.; Corngrit, 2 ft. 10 in.*; and Corsham "bottom," 4 ft. and 2 ft.* In the southern portion we have—point 39*, 1 ft. 10 in., 1 ft. 10 in., 3 ft., 2 ft. 8 in., 2 ft. 4 in., and 2 ft. 6 in.; point 39*, 1 ft. 2 in., 1 ft. 9 in., 1 ft. 3 in., 2 ft. 6 in., 1 ft. 10 in., 1 ft. 10 in., 2 ft., and 1 ft. 6 in.; point 39*, 1 ft. 8 in., 9 in., 1 ft. 10 in., 1 ft. 9 in., 1 ft. 5 in., 1 ft. 5 in., 1 ft. 2 in., 1 ft. 8 in., 10 in., and 2 ft., all of which beds are known as Corsham stone. A fault, with a drop of 9 ft., occurs in one part of the working, and on nearing the Box Ground stone, close by, we observed the following section (fig. 7), which shows the relation

FIG. 7.

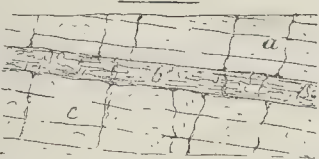


FIG. 7.—Section between quarries Nos. 33 and 39, showing relation of "Corsham" to "Box Ground" stone.

a=Corsham stone; b=Bastard stone; c=Box Ground stone.

existing between the Corsham and Box stones. The beds dip to the S.E. at about 4 ft. 3 in. in 18 yards.

Quarry No. 40.—"Pictor's No. 6 Corsham" quarry. The beds all dip slightly to the S.E., and are as follows:—point 40*, 1 ft. 10 in., 1 ft. 6 in., 1 ft. 8 in., 3 ft. 6 in., 2 ft. 2 in., and

FIG. 10.

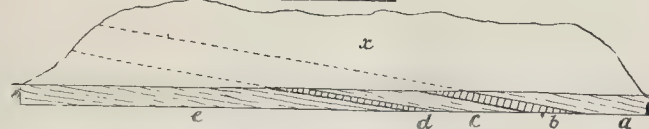


FIG. 10.—Generalised Section through the Box-Corsham Mine, on the north side of the tunnel. a=Corsham, "upper" beds. b=Corngrit. c=Corsham "bottom" beds. d=Bastard stone. e="Box ground" stone. Dip of beds exaggerated. x=Ground over quarries.

2 ft.; point 40*, 2 ft., 2 ft., 2 ft., 1 ft., 2 ft., and 2 ft. 6 in.*

Quarry No. 41.—"No. 7 Corsham," "Spring," or "Waterhole" quarry, yielding beds as follows:—1 ft. 6 in., 1 ft. 10 in., 2 ft., 2 ft., 2 ft. 6 in., 1 ft. 6 in., and 3 ft.* The lowest beds here are remarkable as yielding a blue stone; it occurs in the manner indicated in fig. 8. As will be seen, this material is not found in any large quantity, it has been used principally in churches and for columns. The existence of the bed is not generally known.

On the bank of the quarry above ground we examined in detail the various kinds of Corsham stone in process of "seasoning," i.e., left in the open-air to dry. There is nothing worth recording respecting this, ex-

cept in reference to the Corngrit. The majority of the blocks of this material were

FIG. 8.



FIG. 8.—Section of the two lowest beds in quarry No. 41, showing the mode of occurrence of the blue stone.

a=Normal cream-coloured oolite; a'=patches of the same in blue oolite coloured blue, mostly in lowest bed, but also in bed above; b=patches in a.

found to have hard calcite veins running through them, and always in one direction, at right-angles to the bedding-planes. These appear to hinder the penetration of water through the stone, as will be seen in fig. 9.

FIG. 9.

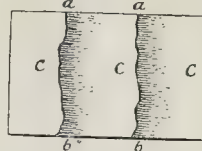


FIG. 9.—Face of a block of "Corngrit," showing calcite veins acting as damp-courses.

a=Hard calcite veins running through the stone; b=Moisture in the stone arrested by a; c=Comparatively dry areas.

On building the material into walls, if the stone is turned up on its bed—and in the case of this particular kind of Bath stone, which exhibits hardly any trace of bedding, this would not facilitate weathering—the thin calcite veins *a* could not fail to act as damp-courses.

Quarry No. 42.—As will be seen by referring to the map (fig. 1), this is not connected with the Box-Corsham stone mine, but is so close to it that the produce is practically the same. It is known as Sands, or Westwell's quarry, and is a comparatively new working. A heading yielded the following beds, all called Corsham stone—2 ft., 1 ft., 3 ft. 8 in., 4 ft., 2 ft., and 2 ft. These thicknesses vary, however, within very short distances, for the bedding-planes are not regular, even for a few yards. At the time of our visit one of the headings was not in good condition, though such an occurrence is, of course, liable to take place in any quarry.

From data derived during our examination, and for the most part given in the foregoing observations on the Box and Corsham areas, we are enabled to present the following as a general section (fig. 10), through the large mine. The bed *c* is not important as a building-stone in some parts of the mine, and very likely merges into *d* or *b*. The Box Ground stone thins out on approaching Corsham, or, at least, becomes so modified in structure that it ceases to be of any value for building purposes beyond the point shown. The base line drawn, which indicates the floor of the present workings along the line of section, is said by all concerned to mark the inferior limit of the good stone, though we had no means of proving this. The best stone is found only

in the position between the parallel lines indicating the floor and ceiling of the quarries. The phenomenon of wedge-bedding accompanying the regular dip rendered it very difficult to make precise observations on these points. From the evidence afforded by the section in the shaft at the "Cathedral" (part of Quarry No. 30) to the west of the area, it seems tolerably clear that the Corngrit and Corsham beds, in a modified form, occur in the ground over that portion of the quarries, and their approximate position is dotted in accordingly. That there are no really good beds of building-stone in the 100 ft. odd above the mine, is rendered certain in the details afforded by the vertical ventilating shafts both in the mine and tunnel, though here and there, at different levels, the material looked promising.

I.—Monk's Park Area.

We have grouped the following quarries under this heading more from their geographical position than from any peculiar features presented. Generically the stone is related to the true Corsham, both structurally and physically, and it is, indeed, often called "Monk's Park Corsham" stone. Then, again, certain kinds are known as "Ridge Corsham" and "Park Lane Corsham." All the workings are mines.

Quarry No. 43.—Monk's Park northern quarry; three headings examined gave—Point 43*, 1 ft. 7 in., 1 ft. 6 in., 1 ft. 10 in., 1 ft. 5 in., 3 ft. 4 in., and 3 ft. 6 in.; point 43*, 2 ft. 5 in., 1 ft. 4 in., 1 ft. 4 in., 2 ft. 3 in., 2 ft. 2 in., 3 ft. 3 in., and 3 ft. 3 in.; point 43*, 2 ft. 9 in., 2 ft. 9 in., 2 ft. 6 in., 1 ft. 2 ft. 6 in., 3 ft., 2 ft. 6 in., and 2 ft. Certain beds had calcite veins running through them, with results similar to those already described (fig. 9); these are, no doubt, the best "weather" beds.

Quarry No. 44.—Eastern Monk's Park quarry; three headings yielded beds as follows:—Point 44*, 1 ft. 2 in., 2 ft., 2 ft., 1 ft. 3 in., 2 ft. 6 in., 3 ft. 6 in., and 3 ft. 9 in.; point 44*, 4 ft., 2 ft. 3 in., 1 ft., 1 ft. 8 in., 2 ft. 10 in., and 4 ft.; point 44*, 2 ft., 1 ft. 8 in., 1 ft. 3 in., 2 ft., 1 ft., 3 ft., 2 ft. 10 in., and 4 ft.

Quarry No. 45.—Western Monk's Park Quarry; a quantity of the material was cut up and decomposed, so much so that it was difficult to work, and the proportion of bad to good stone was very considerable. It is some distance from the last-mentioned quarry, and the produce is known as "Ridge Corsham." Three headings measured gave—point 45*, 2 ft., 1 ft. 10 in., 2 ft. 8 in., 1 ft. 5 in., 1 ft. 9 in., 2 ft. 9 in., 1 ft. 10 in., 2 ft., 3 ft., and 1 ft.; point 45*, 1 ft. 7 in., 1 ft. 3 in., 1 ft. 8 in., 8 in., 3 ft. 6 in., 1 ft. 10 in., 1 ft. 9 in., 1 ft., and 3 ft.; point 45*, 1 ft. 8 in., 2 ft. 6 in., 1 ft. 10 in., 1 ft. 8 in., 1 ft. 5 in., 1 ft. 7 in., 10 in., and 3 ft. Between the first and second points there was a fault running E.N.E., with a downthrow of 7 ft.

Quarry No. 46.—"Ridge" Quarry; close to that last described, but the average quality of the stone was much better, and compared favourably with the true Corsham, in every respect. The material is known both as "Ridge Corsham" and "Corsham Down." A heading gave 1 ft. 6 in., 1 ft. 6 in., 1 ft. 6 in., 2 ft., 2 ft., 2 ft. 6 in., and 2 ft. 6 in.; but in this instance the thicknesses varied within short distances. It will be noticed that the beds are thin, but we measured one block drawn out of the quarry which was 2 ft. 10 in. on the bed, and were informed that occasionally 4 ft. stones could be procured. An interesting case of step-faulting occurred here, which will be alluded to in describing the methods adopted in quarrying Bath stone.

Quarry No. 47.—Park Lane Quarry; situated about half a mile S.W. of the last mentioned. Sections—point 47*, 2 ft. 4 in., 1 ft. 7 in., 1 ft. 5 in., 1 ft. 9 in., 3 ft. 2 ft., and 2 ft.; point 47*, 3 ft. 10 in., 1 ft. 1 in., 2 ft., 3 ft. 2 in., 2 ft. 6 in., 3 ft. 3 in., and 3 ft.; point 47*, 2 ft., 1 ft. 2 in., 1 ft. 5 in., 2 ft. 4 in., 2 ft. 6 in., 2 ft. 6 in., 3 ft. 3 in., and 3 ft. 8 in., all known as Corsham stone.

Quarry No. 48.—Old workings above Bathampton, from which enormous quantities of Bath stone have been extracted.

(To be concluded in our next.)

NOTES.

THE House of Commons Committee on the Tramways Bill of the London County Council has decided to allow the Council to work the tramways, if it desires to do so, subject to certain restrictions as to by-laws. It is by no means clear that the County Council will work these lines, for the Bill does no more than give it the power to do so if it wishes. The further question must be determined by the Council itself. The importance of the decision of the Committee arises chiefly from the fact that it gives a legislative sanction to the demand of the County Council to become both owner and worker of the tramway-lines of London; in other words, to enter into direct competition with the omnibuses and railway companies of the metropolis. Whether it is desirable that a Municipal Corporation should go so far out of its general sphere as to become a simple trader is exceedingly doubtful, and if the principle is allowed in regard to the supply of the means of locomotion it is difficult to see why the County Council should not buy up all the bakeries and butchers' shops in London.

READERS who will refer to our Student's Column of this week will find (page 286) that we have gone into the subject of the efflorescence on bricks which often causes so much trouble and disappointment to architects. We are desirous to pursue this point further in a practical manner; and if architects will send to this office specimens of bricks with efflorescence on them, we should be glad to undertake the examination of such specimens with a view to discovering precisely what is the nature of the growth on the bricks, and from what causes it has probably arisen. The specimens would have to be kept for a few months to note peculiarities of growth, and perhaps to "cultivate" the scrapings in gelatine for bacteriological observation. In other words, we will undertake a scientific investigation into the matter if architects will send us the material for it. It would be well that all specimens sent should have a label attached giving the name and address of the sender, and the name, if known, of the brickmaker, or of the locality from which the brick comes, also whether it has been exposed on a building, and for how long and in what district.

THE management of the Portrane Asylum Competition has been the subject of an appeal by Mr. W. Kaye Parry, one of the competitors, to the Institute of Architects of Ireland. Mr. Kaye Parry had received an invitation to send in competition drawings for a lunatic asylum to be erected at Portrane, in accordance with certain "suggestions and instructions" accompanying the invitation. Mr. Parry's complaints are that the terms of the competition had been violated in various ways; that the first three competitors, of whom he was one, were bracketed together, and three equal premiums given, though the engagement was to give premiums of 100*l.*, 75*l.*, and 50*l.*, to the designs placed first, second, and third; that the designs were exhibited before adjudication, and the names of authors became known, whereas the conditions had expressly promised exhibition *after* adjudication; that the report of the Committee of selection was referred to the Governors of the Richmond Lunatic Asylum for their opinion, which was going outside the advertised conditions of the competition, in taking an opinion from a body not mentioned in the conditions, and doing so after the competitors' names were known; lastly, and

most important of all, that one of the "bracketed" competitors was afforded opportunity of amending his design for acceptance, which was not afforded to others. The President and Hon. Sec. of the Institute of Architects of Ireland (Mr. Thos. Drew and Mr. Albert E. Murray) have given their opinion entirely in favour of Mr. Parry's position in regard to nearly his questions; the questions and answers were published in the *Irish Times* Saturday. It would appear, from perusal of them, that the conduct of the competition has been exceedingly irregular.

THE question of the preservation of wood seems to have been taken a further by the Haskin Wood Vulcanizing Company. By the processes hitherto in use the principle has been the extraction of the sap by some artificial process, and the introduction in its place of some foreign matter such as corrosive sublimate, chloride of sulphate of copper, and pure creosote. These creosoting is the only one that has been extensively used, but it has several objections—viz., the impossibility of impregnating the wood with the oil to any depth, as also that it can only be used for rough out-of-door work, in consequence of its objectionable smell. The vulcanizing process, which has been on view in London during the past week, however, is opposed to any of the foregoing processes, the inventors contending that the sap, by the life-blood of the wood, should be extracted, but should be true within the pores of the wood, so that the whole of the life-preserving qualities retained but solidified. The wood material taken in its green state, and the compounds taken in the sap are, by great heat and pressure, distilled and retained within the wood without losing their antiseptic and preservative properties. By this means resinous and other compounds become agglutinated and impregnate the whole substance. A point which the inventor insists on is that the timber is treated throughout, is without smell, and can be worked with tools with the greatest ease. Some of the interior fittings of the large hotels of New York have been treated with the system, and is stated with satisfactory results. The process is applied by means of the wood being placed in closed steel cylinders, from eight to twelve hours, at a temperature from 300 to 500 deg. Fahr., and under a pressure of 150 to 200 lb. to the square inch. By experiments it is said to have been found that the increase of strength is likewise imparted to the wood by the process.

FOR years many people have used gas for generating the electric light by means of a gas-engine and dynamo, instead of using the gas directly to give light. That this has been done economically on a large scale has been the opinion of many of the highest authorities, and they can now point to the success of the Belfast Corporation as demonstrating their theory. The Corporation asked Professor Kennedy to prepare their specifications, and the system adopted being a gas engine, a short description of it may be interesting. Practically, it amounts to this: The Central Gas Works supplies gas to the engines of sub-stations, which generate electricity and distribute it by the wire system. At present they have a station open which contains one of the largest, if not the largest, gas-engine plant in the world. The six gas-engines were supplied by Messrs. Dick, Kerr, & Co., of Glasgow. Four of them, which are used to drive large Siemens dynamos, are tandem engines, that is, their cylinders are in one line, their pistons actuate the same piston-rod, so that there is an explosion for every revolution of the crank. This greatly reduces the steady running, a first essential in an electric-lighting engine. The gas engine is more economical than the double gas-engine, and there is a

vided saving in floor-space. The engines on each being started at once, all that is necessary being to turn a switch on the ditch-board. This is done by letting one of the dynamos run as a motor until the engine is started. This method of starting engines, we believe, first employed by Sir David Tompkins, at his private residence at Broomfield, Tunbridge Wells. The convenience of being able to turn on and off your engines at will, and the saving in boilers and attendance, of gas-engines a great advantage in this respect over steam-engines. The Corporation are only charging 7d. per unit, the same as at Dublin and Glasgow, and yet they are making a fair profit. We would commend the action of the Belfast Corporation as being well worth considering by other local bodies who are interested in gas. An illustration of how to prevent the progress of electric lighting depreciating property.

REPORT was presented recently to the Local Government Board by Dr. Strode on the general sanitary condition of the village of Linslade, in the Leighton Rural Sanitary District, and on the circumstances attending an outbreak of typhoid fever there. In the course of the report it is stated that the water supply is derived almost exclusively from wells sunk in the Lower Greensand, the formation on which the village is in the main situated. The wells are all dry-stained, and in numerous instances are in positions which seriously endanger the purity of the water they supply. Many are situated but a few feet in each instance from a privy sunk in the ground level, or in contiguity with a ditch situated at a higher level than the well; and it is believed that three-fourths of the wells in the village are contaminated. A great part of the drainage of the village goes into a stream which flows through almost the centre of Linslade, and receives the drainage of at least 120 houses. The condition of this stream has in the past given rise to numerous complaints, and it has been recently cleaned. In fact, its state at the present time is described as being better than ever before. The water in it gradually assumes the appearance of liquid sewage as it passes through the village, and this is more particularly noticeable where the water is comparatively deep. The bottom of the stream is covered with a deposit of thick black mud, which rapidly imparts an inky colour to the water upon being disturbed. Several people in Linslade complained of the nuisance which the stream frequently caused, and of the objectionable odours which emanated from it. The stream is disposed of in Linslade either by means of privy-vaults, sunk below the ground-level and lined with brick; or by closets, of which there is an increasing number in the village. The privy-vaults are numerous, and are frequently so close to the wells as to seriously endanger the purity of the water, and so near to the dwellings as to not necessarily pollute the soil beneath the houses, and contaminate the air in their vicinity. The privy-vaults are emptied by scavengers when full, and the average interval between the operations is about five months. The Report sums up to the effect that "the general sanitary condition of the village is such that a public water-supply and a proper system of sewage are greatly needed."

VERY radical-looking pamphlet which has been forwarded to us, from the English Land Restoration League, "entitled among the Agricultural Labourers with the Vans," appears to derive its title from the fact that in the first instance an old Post Office parcel van was purchased as a vehicle to send men up and down the country to preach the doctrine of the restoration of the land to the people, &c. With its political doctrines in the wider sense we have no concern, and should not have

noticed the pamphlet except for the illustrations given on two pages (from photographs) of the residence of a large owner of property in Wiltshire, and of the interior and exterior of one of the labourers' cottages on his estate. The illustrations being from photographs, there is no room for exaggeration, though no doubt this may be a specially bad example picked out. However that may be, the presence of a dwelling-house in such a state as this cottage, on a presumably wealthy owner's estate, is a disgrace to the wealthy landowner. We refrain from giving his name, though the "Land Restoration League" (naturally) is not so reticent.

THE Metropolitan Public Gardens Association have completed their laying-out of All Hallows-on-the-Wall churchyard, in London Wall. The ground lies in two slips, to the east and west of the church, between the street and portions of the old City wall. Of the church, built in 1765-7, after the designs of George Dance the younger, and of its history, we gave a short account in a "Note" on June 28, 1890. In our issue of April 25, 1885, we published a view of the former church's exterior, after Toms and West, with a description taken by Toms from Hutton's "New View." So we need only say now, that four years ago was announced the discovery in an old chest in the vestry, of a register of churchwardens' accounts, with entries beginning from the reign of Henry VI. In the course of next month the Association will open the disused burial-grounds of St. Mary's, Woolwich, and St. Peter's, Walworth, as converted by them into places of public resort and enjoyment.

THE Tol-house Trustees, Yarmouth, ask for subscriptions towards their projected purchase and preservation of some interesting remains of the Franciscan Monastery in that town. Speed records that the Grey Friars, or Minorites, were settled in Yarmouth by Sir William Gerbrige, Knight, of Wickhampton, who was bailiff in 1271; by another account they were established there, somewhat later, by Edward II. They seem, either way, to have come from Norwich, where the Order stayed first in 1226. In accordance with their wont, the various Orders, in taking up residence at Yarmouth, divided the town into four districts. The Carmelites, or White Friars, went to the north, the Dominicans, or Black Friars, to the south, the Augustines to Southtown (with a cell within the walls), and the Grey Friars to the middle. Thus the Franciscans built their house on a spot lying between the river (west) and the Middle Gate (east); the two rows numbered "83" and "96" marking, latterly, the north and south limits respectively. Their conventual church stood about midway down Queen-street; next south lay the cloisters (wherein the bailiffs often held their courts), remains of which may yet be found in the walls and cellars of cottages round about. The cloisters enclosed a "green yard," being, we think we correctly say, the burial-ground behind the Unitarian Chapel, *prius* "Old Meeting House." Here the friars prospered, counting among their benefactors Thomas de Drayton, who was Admiral of the North in 1338, and three times elected Burgess in Parliament for the borough: he was a contemporary of Hugh Fastolf. At the Dissolution Grey Friars was granted to Cromwell, Earl of Essex, and next to his nephew, Sir Richard Williams: in 1569 it is owned by the Corporation. In 1608 James I. gives them a charter to hold the site of the late house of Friars Minorite. A few years later part of the area was taken for an artillery-yard and exercise-ground for the trained band of Militia; in 1657 the Corporation sold for 2,600*l.* a large portion for the building thereon of a "broad row" (Queen-street) and a "narrow row." A leading share in the preservation, lately effected, of a part of the

cloisters was taken by Messrs. Bottle & Olley, of Yarmouth, who, in conjunction with Mr. Loftus Brock, were employed as architects for the repair of the Tol-house, ten years since; *vide* our "Note" of February 2, 1885.

THE Carpenters' Company is offering some special prizes, in connexion with "Harben's Gift," for the encouragement of artistic design and workmanship. One of those which we are most pleased to see is one for "A Chair for Ordinary Use" which can be sold at a price not exceeding 1*l.*, which must be accompanied by a guarantee that the firm exhibiting it will supply it to the public at the price named. When we see the word "firm," we hope it is also to be an understood thing that the name of the man who actually designed the chair will be given. As we have often pointed out, a "firm" cannot make a design, which must be the work of an individual mind. In connexion with this subject we may remind the Company that Mr. William Morris long ago did produce a chair answering to these conditions, which was sold at, if we remember right, 9*s.* or 9*s.* 6*d.* We believe the price has been raised somewhat since then, but that is probably only a consequence of the general rise in cost of labour. Another prize is to be awarded for "A Hall Bench with Carving," and another for a Table 4 ft. by 3 ft. 4 in. measurement, which must combine strength and steadiness, and be offered at a price not exceeding 5*l.* For a plain table of the size mentioned, the price seems pretty liberal. The foregoing prizes are to be given this year, and next year it is announced that a special prize of 20*l.* and a gold medal will be given for the best font-cover executed in oak. A long date has been given, so as to enable those who have not much leisure time to enter into the competition.

THE President of the Royal Society of Painter-Etchers was "At Home" to members and their friends at the galleries of the Society on Friday last. A notice of the etchings on view has already appeared in the *Builder*. After the reception, the President, Mr. Seymour Haden, gave, by request, an illustrated lecture on certain points connected with the etched work of Rembrandt. He said that during the past forty years much has been done to dissipate popular errors concerning the etched work of Rembrandt, but much remained to be done; gross errors of attribution continued to appear in catalogues and books of reference. That Rembrandt did etchings prior to 1628 there could be no longer any doubt; at least two portraits existed anterior to that of his mother, dated 1628. These were done when he was seventeen years of age, *i.e.* four years prior to the generally accepted date. Rembrandt did not, like most of his contemporaries in other countries, go to Italy for inspiration; he devoted the thirty years of his artistic life to work in his native country. During these years he produced some 250 etchings. Dividing this period into three decades, it would be seen that Rembrandt employed during each one a different method of production and a different class of subject. For the first decade he almost exclusively devoted himself to bitten work in the production of figure subjects; during the second decade to bitten and dry point, chiefly in landscape; the third and last decade to pure dry point, with a return to figure subjects. In the first division of the thirty years he worked on original ideas, during the second and third he frequently adapted the subjects and drawings of others to his own methods. In many cases his pupils or assistants worked on the background or accessories; the principal figure, or, perhaps, a face only, being the master's work. Of this, many notable examples existed. As might be expected, there were cases of overlapping in respect of method of production and choice of subject; but

these sub-divisions were broadly correct, and greatly assisted in the study and appreciation of Rembrandt's works. Of the attribution to Rembrandt of etchings now known to be by Lievens, Bol, and others, Mr. Haden had many things to say. Examples of Rembrandt's works, in the order mentioned, were shown on a screen, the illustrations in all cases being excellent. The chronological order of arrangement of an artist's works, particularly those of Rembrandt, has great advantages over the subject arrangement. The arbitrary method now adopted in our own and other museums might be usefully replaced by an arrangement according to the date of production. The usual existing methods only confuse the sense and render critical comparison impossible.

THE Exhibition at the French Gallery in Pall Mall contains a large and remarkable Turner, "St. Mark's Place, Venice" (25), earlier in date, we are told, than its style would lead one at first to suppose. It is a view looking apparently from the top of some building along the Place, with St. Mark's in the distance and the Campanile in front of it. St. Mark's is represented in a white glare which it hardly could assume under any atmospheric circumstances, and the whole effect of the picture is unreal, but it is an effect one would be very glad to see if it were possible. A collection of paintings by M. Tholen form a group by themselves. He excels in small paintings of buildings combined with woodland scenery (see Nos. 37 and 40); his largest work, "Through the Wood" (44), is cold and destitute of light. The evening scene called "The First Christmas Eve" (38), one of those realistic readings of New Testament history which have had an attraction for some French and German artists of late years, is a fine piece of evening landscape effect. Madame Henriette Browne's "Rhodian Girl" (4) is a powerful and striking picture of a dark-complexioned girl, clad in a red mantle and pink head-dress, giving the general effect of a "study in reds"; there is great power and dignity about this work of an artist whose genius is too little known in this country. Mr. C. Jacquet's pictures of sheep and landscape (7, 8, 11) are not equal certainly to Van Marcke (of whom there is a good specimen, No. 1), but are broad and powerful works of their class. In No. 8, "Collecting the Flock," it is amusing to see what we may call "the Creswick dog" in the foreground, just as he often appears in Creswick's landscapes. A large painting by Ary Scheffer (55), very carefully composed, but otherwise not very interesting, recalls the echoes of a departed fame. Professor Firle's "Dreams of the Past" (59) is a large interior with figures, remarkable for its successful representation of light; the figures themselves rather want interest and attractiveness. The collection includes two small pieces by Weber, one of them the only calm sea by him we ever remember to have seen, and various works by Heffner, which, it is to be presumed, have a market-value; those who wish to possess their Heffner can procure one here. To the habitué of picture galleries it is *toujours perdrix*, and not very well-flavoured either.

THE new English Art Club Exhibition at the Dudley Gallery is less aggressive than many of its predecessors, though one is still obliged to wonder what freak of impudence possesses people who can hang such things as Nos. 41 and 79, for example, and call them portraits of ladies. The last-named is a portrait of a married lady, in whose behalf we should expect her husband would bring an action for libel against the painter, if he had a grain of spirit or proper feeling. On the other hand there are some works which are very interesting as illustrating the amount of originality of colour treatment which can be shown in a free and unfinished study of

effect. Among such are Mr. Bertram Priestman's "A Blizzard at Sea" (37), Mr. E. Stott's "Milking-time, Early Morning" (39), an interior of a cow-house, lighted from outside, in which the effect of morning light is very truthfully conveyed; Mr. Draper's "Putting Out to Sea" (43), with the sketchy-looking boats visibly straining in the wind. Mr. Wilson Steer's portrait of Mr. Croal Thomson is a good likeness, but the treatment of the hands is disgraceful. Mr. Jas. L. Henry's "Waning Light, Boulogne" (82), is a really fine work, and the best thing in the room. Among other things that are of interest are Mr. Housman's title-page for a book (No. 1); Mr. Henry's sketch "At the Dock Gates" (8); Mr. D. S. MacColl's "River Landscape" (15); Mr. Pegram's portrait-sketch of a boy (27); and Mr. Charles Conder's "Premier Bal" (66), a sketch painted on silk of a girl seated in a balcony and a cloaked figure on the left; this is a mere sketch, but as a study of delicate colour harmony it is of the greatest interest and originality.

FROM the "Year Book of Australia" it appears that the past year has been an unusually bad one for architects, owing to the financial circumstances of the Australian Colonies, although some few buildings of importance have been erected or completed. It is noted that a development of exterior coloured decoration is one of the latest features in Australian work, and also (according to the "Year Book") a prevalence of "Romanesque and Jacobean feeling" (*sic*) in recent buildings. This last development seems rather enigmatical.

WE wish to call the attention of architects who send drawings which they wish to have reproduced in this journal, to the importance of always placing their name and address on a drawing, either on front or back, along with a brief title which will identify the drawing. We not infrequently receive drawings with nothing on them to identify them in any way, except by reference to a letter which comes by a different post, and which sometimes gives no description of the drawing either. Those who send drawings in so careless a manner, besides causing unnecessary trouble, run the risk of losing them or of indefinite delay in receiving them back again, and, in such case, certainly have no right to complain.

MAGAZINES AND REVIEWS.*

Nos. IV. and V. of the *Architectural Review* (Boston) have reached us together. From an article in No. IV. we learn that the question of abandoning perspective drawings in competitions is making division in the architectural camp in America. Those who are in favour of it seem to be moved largely by the influence of French practice. The *Review* complains that the value of a perspective "in acquainting interested parties with a knowledge of how the building will look when completed is not considered, because it is maintained that laymen are not privileged to judge the design of a structure before it is executed." An article in the same number proposes to open the pages of the *Review* to more criticism of current work. It is hoped that in this way some things may be explained which are not now understood; for instance, why it is a prevailing craze to cover every piece of terra-cotta that is used in a building with ornament, and whether it is because architects think they are getting a bargain when they get the effect of carved stone at half the cost, and therefore want to have as much as they can of it. A solution of this question might be interesting on both sides of the Atlantic. The illustrations are chiefly occupied with figured geometrical drawings of Mr. Hunt's design, for the Fogg Art Museum for Harvard College,

* The object of these notes is to point out anything in the contents of the current magazines which is of special interest to our readers, with occasional brief criticisms on the views expressed in such articles. When a magazine which has been sent to us is not noticed, it is because that number contains nothing that it is within our province to comment upon.

† That sentence may be American, but it is not English.

a building framed apparently (externally at least) on strictly Greek lines. Why are the windows all barred up with iron gratings, even in the Attic? Is it supposed that the content will be exposed to pillage by enthusiastic students? The elevation for a house in New York, by Messrs. Carrère and Hastings, looks as if it came from the Avenue de Champs Elysées. American architecture, which was promising to make a style of its own, seems to have collapsed in this respect. In the illustrations of No. V. we have Gothic again, in the designs by Messrs. Cope and Stewardson for the rood-screen and Lady Chapel in the church of St. Luke, Germantown. The rood-screen is a fine and rich piece of work, but is almost pure Medieval Gothic. The number contains a very fine illustration of the side view of the Giant's Staircase at the Duc Palace, from a measured drawing by Mr. E. H. Taylor.

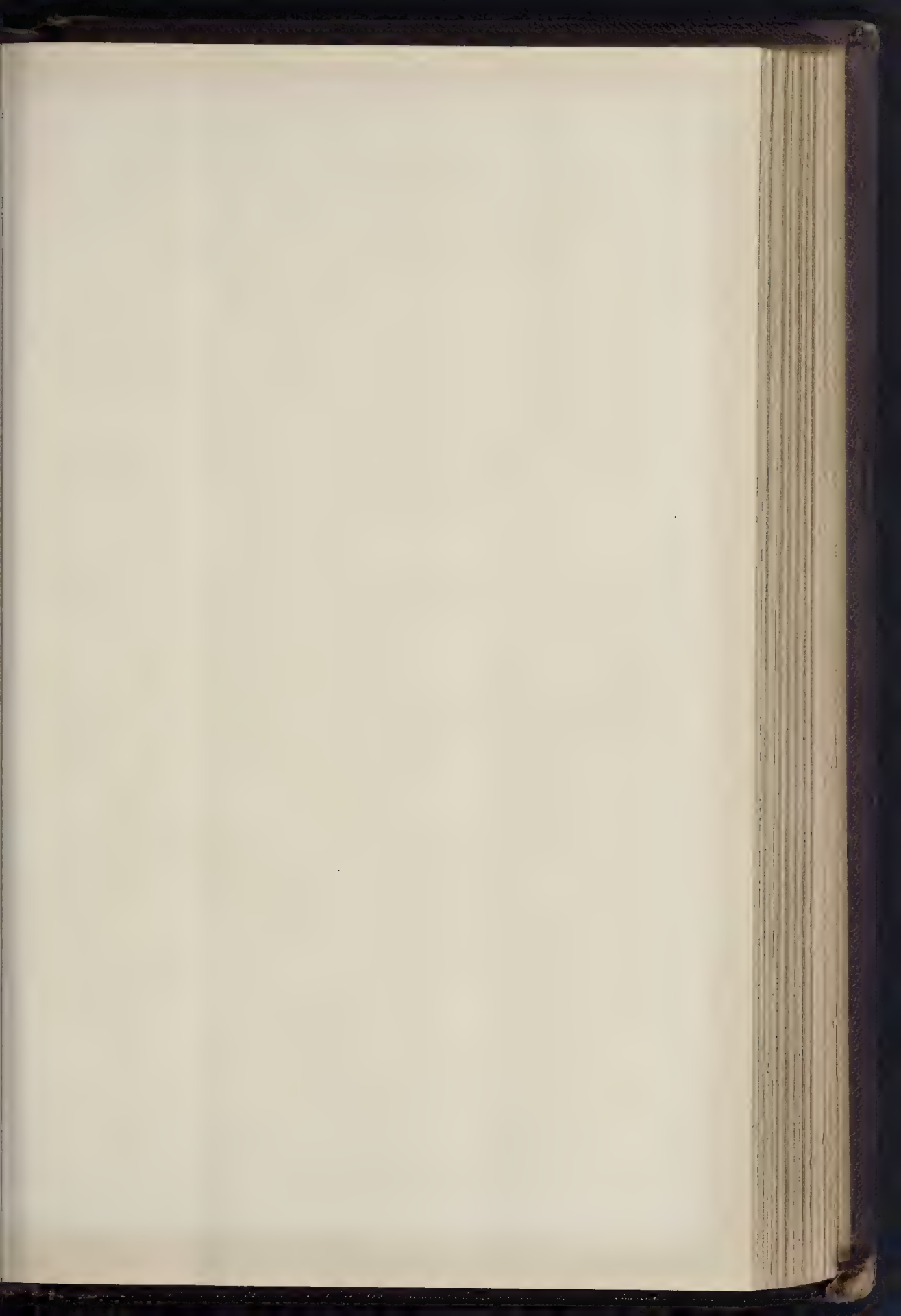
The *Art Journal* is entirely devoted to the life and works of Sir Noel Paton. To give number of illustrations in black and white of the works of "Her Majesty's Linner for Scotland" is to present his work in the most favourable light possible, since we get rid of the crude and conventional colouring which is his weakness. Many of the outline illustrations, and heads and studies, are very charming; a single plate of the "Ancient Mariner" series is reproduced on a small scale; this series of outline plates is one of the best things Sir Noel Paton ever did. But we fear we cannot be persuaded to think him a great artist.

The *Studio* has an interesting and enthusiastic article on a really great artist, Pavis de Chavannes, by M. Gabriel Mourey, whose analysis of Chavannes's work and its aims is very thoughtful and worth reading carefully. The article is illustrated by reproductions, both from finished works and from his studies.

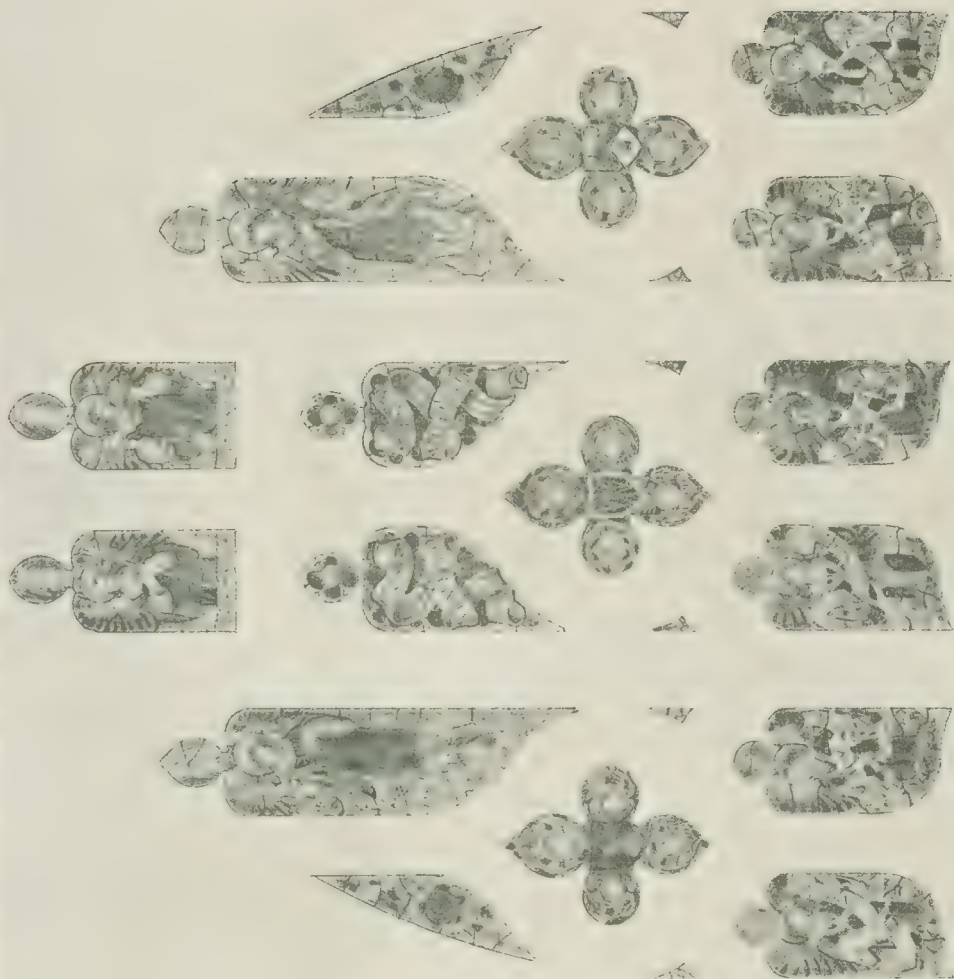
The *Fortnightly* contains an article by Mr. John Brett on "Landscape at the National Gallery," going into the merits and demerits of the principal classes of landscape in the National collection. Mr. Brett's outspoken opinions of Claude, Both, Ruysdael, &c., will astonish the respectable mediocrity who frequent the National Gallery, but they are not far from the truth in most cases. We should say that Mr. Brett underrates Claude very much, though we agree with all that he says about Both, Ruysdael, and Hobbema. When he says that "Gaspard Poussin was an artist in composition, but 'knew nothing about trees,' surely we should have expected the same criticism as to trees to be applied to Gainsborough, who painted trees—what may be called the Gainsborough model. However, Mr. Brett's criticisms in the main are both wholesome and amusing reading, and will open the eyes of some of the public.

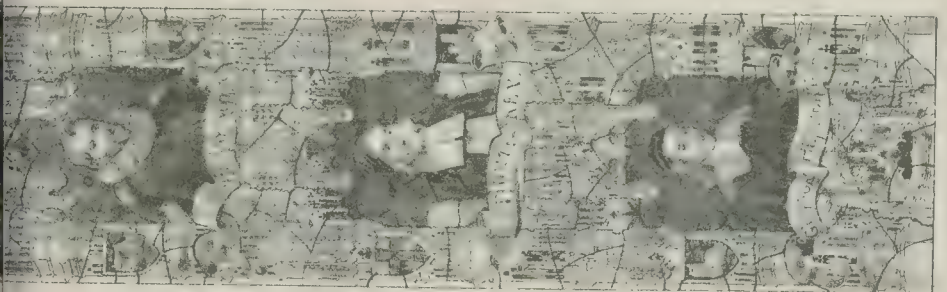
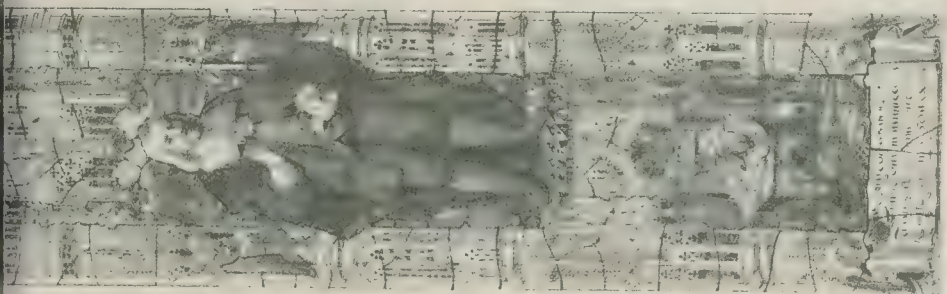
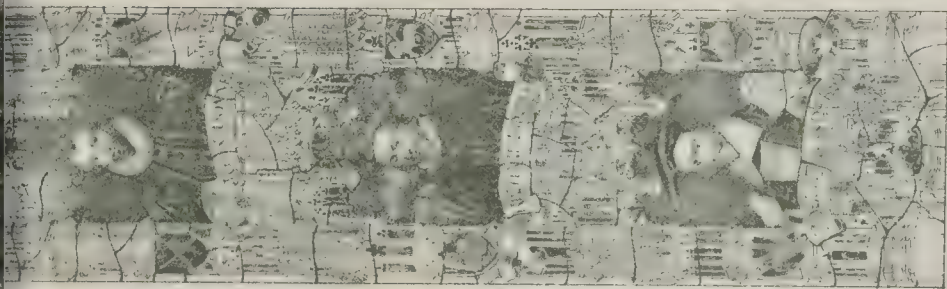
The *Nineteenth Century* contains an article by the Count de Calonne on "Domestic Architecture in Paris," which is of considerable interest. The course of it the writer discusses the relative advantages and disadvantages of the Paris "flat" system and the London single house. Architecturally he is decidedly in favour of the former, arguing that it is much better to have a fine block of building with one entrance which can be treated with architectural dignity, than a row of smaller houses with ten entrance doors which are generally all alike and cannot receive much architectural treatment. In other more practical respects he considers the Paris system has many drawbacks, of whom the *conciergerie* is the greatest. It appears that a little while since there was a move in favour of the self-contained house in Paris, which was checked by the discovery that it was much more assailable by burglars than the mansion in charge of a *conciergerie*. The article contains a great deal of interesting information and criticism in regard to the architectural treatment of Parisian houses. The same magazine contains an article by Sir John Lubbock on the London water companies question, warning the public against the enormous expense which would be incurred in buying up the companies, a suggestion in conclusion the compulsory appointment, on the board of each company, of a director nominated by the Government, one of the London County Council, and one to represent any outside county supplied by the company.

In *Scribner* the serial article on American wood engravers deals with the work of Mr. W. W. Clouson. This artist has been experimenting with a new method of treating the wood-block surface (not described), by which he claims to have produced effects of a breadth and facility of treatment approaching etching. The engraving of a portrait given as an illustration in the article, is remarkable for its softness of tone and texture.



THE BUILDER APRIL 13 1895





IZAAK WALTON MEMORIAL WINDOW, ST. DUNSTON-IN-THE-WEST

BY MESSRS. PERCY BACON & BROTHERS

In the *Century* is an illustrated article on some Tesla's recent electrical work. The serial title on old Dutch masters, by Mr. Timothy Le, deals with Ferdinand Bol, and is illustrated with an engraving from one of his portraits. "A New Field of Travel" (II), by Miss H. W. Preston, tells of Spalato as it now exists, illustrated with good many sketches by Mr. Pennell.

Harper includes two illustrated topographical tales, "Venice in Easter," by Mr. Arthur Mounse, with illustrations by Mr. Guy Rose, and "Autumn in Japan," by Mr. Alfred Parsons, with twenty-one illustrations by the author, all of which are charming, and give a vivid idea of panse landscapes.

In *Blackwood's Magazine* the friends of a eminent archaeologist, as well as others, may be interested in an article entitled "In Mytyleth the late Sir Charles Newton."

The *London Home*, a monthly magazine which confess not to have heard of before, has been sent to us, and contains a sketch and description of a design for a London home, by Messrs. Willie Scott and Seton Morris, the title of which rather a misnomer, as it evidently means a use outside—very much outside—of London; a tall detached house with trees round it, with steep roofs and a half-timber upper story, that looks picturesque, but it is not the way

to make the most wholesome or comfortable use on a small scale, though it is no doubt economical, and it is intended that the house should be built for 800l. The plan is rather too and-out and full of small corners, the pantry as passage to the kitchen is not a very convenient arrangement, and we should have liked to have a scale to the plan. Plans of picturesque all houses without scales attached are sometimes

deceptive as to the real size of the rooms. The *Engineering Magazine* (New York) contains an article by Mr. Barr Ferree on "Recent architecture in France," with a number of small illustrations reproduced from photographs. The inters seem to have made some blunders, as Musée Galliera for "Galliera," and "M. dille" for "M. Sedille," which cannot be the

ill of the writer of the article. Mr. Ferree looks that while there is much that is good in recent French architecture, much that is fine, and some things that are great, "the actual buildings do not come up to the standard of school work itself," and that with such a

system of architectural education maintained by the Government, the result should be something more than an occasional fine building. Some critics on our side of the channel would perhaps say that is exactly in conformance of this elaborate State education that

we are (if it be so) few fine modern buildings in France. On the other hand, the system of education shows its results, to our mind, in a general high level of architectural design, the which is not to be ignored. As for great buildings, the which strike one as works of genius, no system of education can produce those; but it is some-thing to have a system which maintains a generally high standard, and perhaps France alone boasts of that at present. In the same magazine is an article which excites rather melancholy emotions, on "Water Powers of the Western States," illustrated with a number of views of the finest exquisite bits of romantic water-fall scenery. Alas! from henceforth this is only

"water-power." In the *Pall Mall Magazine* Mr. Walter Besant's story on Westminster (Chap. VIII.) deals with the streets and the people," but is also illustrated by many good and interesting sketches. Mr. W. Patten, including a number of sketches of the grotesque animals on the exterior of Henry VIII. Chapel, of the existence of which, of their peculiar style, many people are hardly aware. To the same magazine the Countess of K contributes a pleasant article on "The old square of a Street," viz.: Charles-street, London-square, in which the writer lives; it is accompanied by some excellent sketches by Mr. Massey.

The *Monde Illustré* contains an article by Mr. Neukomm on the life and works of M. Alexandre Struys, the Dutch painter, whose career is illustrated by engravings of two of his fine works. M. Paul Winiath contributes an article on the "Association Générale des peintres de Paris."

The *Gentleman's Magazine* contains a short notice on "Giant Telescopes" by Mr. J. E. Gore, in the course of which he records the opinion of Mr. Clark, that in spite of the greater absorption of light by the thicker lenses in large telescopes, the powers of the instrument increase in proportion with the increase in diameter

of lens than the absorption by the lens; that the 30-in. object-glass which he made for the Nice Observatory is greatly superior to the 26-in. one at Washington, the 36-in. telescope at the Lick Observatory superior to the 30-in., and he expects his new 40-in. one to be superior to either. Remembering the time when it was considered a great thing to have achieved a successful 12-in. object-glass, this progress in surmounting obstacles is remarkable.

The *English Illustrated* contains an account of a visit to Mr. William Morris's printing-room at Kelmscott House, with a view of the house and portraits of Mr. Morris and his daughter, also a reproduction of a page of the Kelmscott edition of "Maud," very decorative to look at, but with the words printed straight on instead of being arranged in lines, a misuse of the art of ornamental page-making against which we have before protested. Artists may like the effect of the page, but poetry is after all for reading, not for decoration, and no lover of poetry wants to read "Maud" in that form. Poetry is verse, and ought to be printed so. Printing a book thus is making the contents of the book of less importance than the setting, which is absurd.

CARPENTERS' HALL LECTURES:

WOOD-CARVING.

The last of the series of lectures on matters connected with building arranged by the Worshipful Company of Carpenters was delivered at Carpenters' Hall, London Wall, on the 3rd inst., by Mr. W. K. Lethaby, on "Wood-Carving."

Mr. Nieman Smith, the Master of the Company, presided, and apologised for the absence of Sir James C. Lawrence, who was to have occupied the chair, and of Mr. H. Heathcote Statham, F.R.I.B.A., who was to have lectured on "Natural Foliage and its Treatment in Wood-work," but was prevented by press of work from doing so.

The lecturer—whose remarks were illustrated by some small groups, a figure of Late Gothic work, some casts of thirteenth century misericords, &c.—said he had made no attempt at a balanced and consistent treatment of his subject, but had merely set down some notes on points which had especially interested him, whether historical, practical, or speculative. It was particularly interesting to inquire what relation the arts usually called ornamental bore to one another and the fine arts before an audience of architects and practical men, and it was because he wished to be really practical that he did this. It seemed to him that all instruction in the arts of design must be taught experimentally, tool in hand, and that all their talking over their subject could do was to suggest a mental aspect—the atmosphere, as it were, which surrounded production. He would encourage effort, stimulate questioning, arouse curiosity to gaze over the great panorama of life and art which history unrolled before them; and he would incite to an examination of the chains of custom which bound them in regard to the arts. First he wanted to ask not so much how they should carve in wood, but why they should carve it at all. Fortunately, there was no room for misconception as to the purpose and contents of the art now under consideration. There was no excuse of utility nor compulsion under building and sanitary Acts, which they might urge if they failed, of the one and only purpose of decoration. Let them start by fairly acknowledging that wood-carving was perfectly useless—even less than useless. If it were not beautiful—interesting to the beholder, and a delight to the worker—what should justify it? If their wide and accurate knowledge of that art had been one of many causes for their present sterility in production, this he believed, should be rectified, not by their seeking to forget the past, but by their seeking another point of outlook, a larger view, and the re-combination that followed minute analysis. He who, at this time, knew best what the constant spirit of past art had been, knew best what its future would be. Let them not study Greek as Greek, nor Gothic as Gothic, but see in them only phases of the one universal art. So far as they studied past art let them classify their observations in structural and artistic categories, and not according to geography or chronology. The one would prove a knowledge of art; the other a knowledge about art. By way of history he proposed to speak of only two periods when stories and ideas were cut into wood: of the Greek period, because so much superstition was still felt for Greek art as something apart especially refined and civilised; and of Gothic in England, for there they found the thoughts of their own race

in its first maturity and enthusiasm. The earliest figure sculpture was wholly or very largely of wood, and the oldest statue in the world now rested in the Cairo Museum. An Egyptian statue of wood might also be seen in the British Museum, but this was much later work. In Greece the log statue not only left a legacy of style which might be recognised in the early stone figures; but a great number of the primitive statues of wood remained in the temples throughout the periods of the culmination and decay of Greek art. The Greeks, indeed, in a special way, seemed to have had the historical sense, and to have revered the art of their fathers, allowing the brick and timber temple to stand side by side with the marble one, and the primitive log statue with that of ivory and gold. Having referred in some detail to old Greek figure-sculpture of wood, the lecturer said that carving was doubtless much used in adorning structural timber work and furniture, although inlay of ivory, pearl, and metal seemed to have been a more favourite method of decorating wood-work.

Coming to our own land and our own tradition, Mr. Lethaby remarked that, in wood-carving, work was done here, and in part remained to us, having a particularly national character, and in beauty second to no other. Indeed, in certain forms of decorative art we had led the world. Referring to some of the treasures wrought by great artists—yet simple craftsmen wood-carvers—of the Romance period, he said the earliest ornamental woodwork which remained to us were the crumbling fragments of St. Cuthbert's coffin, preserved in the library of Durham Cathedral. This coffin, which was probably that in which the Saint was buried in 698, was covered with incised patterns executed with a knife. These carvings represented the Virgin and Child, with apostles, saints, and the symbols of the four Evangelists, their names being inscribed in Saxon characters. Of the first half of the thirteenth century there was the magnificent set of misericords belonging to the stalls at Exeter Cathedral, and of the earliest fourteenth century they had the superb carvings at the back of the choir-stalls at Winchester. At the opposite extreme as to manner of workmanship, but still of fourteenth-century work, they had the Warwick violin, lately shown at the Grafton Gallery, and of which a reproduction might be found at South Kensington. Another quite matchless piece of work of the same century was a panel, of oak—lately acquired at South Kensington Museum—some 5 ft. by 2 ft., displaying the combat of St. George with the Dragon, in three scenes, which were interwoven in one continuous design. Having alluded to the hundreds of examples of misericords of the fourteenth and fifteenth centuries which remained in the choirs of our great churches, such as Gloucester, Hereford, Worcester, Winchester, New College Chapel, Chester, Carlisle, and Norwich, the lecturer said the most accessible and (though late) astonishingly minute and interesting set of misericords were those in Henry VII.'s Chapel at Westminster. Ornamental wood-carving of the fifteenth century might be found in every church which had not been too completely restored, from the churches of the Land's End to those of the Eastern Counties and the North. In one they would find seat-ends and a screen; in another a pulpit, lectern, or chest; in a third roof bosses and carved roof timbers. In England, there were but few examples of wood statues of the Middle Ages now existing. There was the thirteenth-century effigy of Robert of Normandy at Gloucester, and a fourteenth-century Bishop at Canterbury. Unfortunately, the great imagery of the roods had almost wholly disappeared in England, and we could not bring forward anything to equal the great crucifixes of the thirteenth century, such as might be found in France or Germany. Our roofs, however, were quite populous with angels, some of them, like those at Blythborough, being extremely fine. We had, he believed, no recognisable remains of wood retables such as the great painted and gilt erections in Germany, fine examples of which might be studied in South Kensington Museum. In the sixteenth century there was a great and sudden change in the purpose and aspect of the arts; they were not from this time required so much for the common church. But private patrons, who had seen Italy, talked of the antique, and scholarship began to take the place of feeling. The worker ceased to be a thinker. Then, with the completer farming of labour, general production became much less amusing, and free art was no longer required, or indeed allowed, in our buildings by the new architect, who was no longer a builder, but a man of taste. Every-day work fell to a Russell-square level—

far from the lowest possible—and picture-shows were invented. In the sixteenth century the sense of beauty began to fade out from the workmen's purview and covenanted accomplishments. Still, in the seventeenth and eighteenth centuries some decorative sense remained which was truly expressive, although not expressive of the highest things—life, romance, nature were not attainable, but a sense of the ornamental lingered on, especially during Elizabethan and Jacobean times, while master builders and architects allowed the fancies of the workmen house-room. Urging his hearers to look on past art to find there only incentive and stimulus, and not a set of rules and forms paralyzing their own thought, and endeavour—as had been the case the last 300 years—the lecturer turned to some considerations in regard to design. The range of carving, he said, varied from the mere outline of incised work up to the "agreeable bossiness" of full relief. Apart from subject, carving must present them with an agreeable abstract arrangement in the interchange and graduation between light and dark. In a fine work there were no flat surfaces, no mechanical finish; all was swift free painting with the tool. Breadth must be kept in mind; there must be a sense of their big surface containing all the little surfaces. This sense of breadth must be maintained in the group, or statue, as well as in the relief; that was in the finished work they must still be able to feel a suggestion of the original lump or log of timber. Mr. Lethaby proceeded to suggest the great range of treatments that were open to the carver, some so simple that the merest beginner could handle them successfully with a plank and two tools; others, so difficult that an able sculptor might fail, and now unassisted by tradition, certainly would. Mentioning that gilt ornamental carving, other than figure work, had been most largely used for picture-frames, he observed that the picture-frame might well be reformed by somebody seeking a virtuous calling—some 30,000l. or 40,000l. must be annually spent in the tawdry makeshifts for the London picture shows. He next alluded to the increased facilities which now existed for learning how to set about carving wood and obtaining practice in the use of tools. Schools entirely practical, like the fine schools of the Carpenters' Company in Great Titchfield-street, and the other Polytechnics offered opportunities which should be more widely known and more largely used by the young craftsman in supplementing and forestalling the results of his daily practice. In further remarks he trusted the mere fashion of ornamentation was going out of vogue. Unless they could get ornament, thoughtful, personal, bright, and sweet, they were infinitely better off without it. "Beyond the twenty hiring styles," he said, "cultivate a twenty-first—your own. Or, better still, forget the styles and find yourself. The mission of the carver in wood is not to cut meaningless sinuosities of line or undulations of surface. His part is to observe, feel, express. All art may be defined as the science of feeling and of stirring feeling in others." Towards the close of his lecture Mr. Lethaby remarked that there was a tendency to ridicule the idea that it was necessary for design and craftsmanship to go together, but in such an art as wood-carving this was, he believed, accurately true. He could not remember, he added, any piece of wood-carving that had interested him where the design had not been the workman's own. Finally, in regard to our own contemporary and future style, he expressed dissent from such of his friends as called it eclectic. He inclined to the refusal of all labels. Naturalism would not do unless it was stretched to cover the crudest abstraction, nor Realism, unless it included the uttermost of Romance, nor Humanism which suggested scholarship and had been limited by association with the Renaissance. But if a name must be found it should be wide enough to include all these together and to cover the whole ground between the four cardinal points of art—Nature, tradition, requirement, material. Might the builders and craftsmen amend the Impressionist art of the painters into Expressionist?

The Chairman, in proposing a vote of thanks to the lecturer, mentioned that in many churches in the Eastern Counties there was an immense mass of carved wood-work which would instruct them in art. He then directed attention to the competition in wood-carving to be held in June, and said that in connexion therewith prizes of gold, silver, and bronze medals, and money, would be offered to members of the trade, amateurs and students, including ladies.

The lecturer briefly replied, and the meeting terminated.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday, in the County Hall, Spring Gardens, Mr. Arthur Arnold, Chairman, presiding.

The Water Question.—Mr. Benn, M.P. (Vice-Chairman), moved:—

"That, in the opinion of the Council, it is desirable that the Parliamentary Committee should press forward in Parliament the London County Council Bills for the purchase of the Lambeth and the Southwark and Vauxhall Water Companies with all possible speed."

He submitted that the motion was distinctly of a non-party kind. The resolution referred to only two companies, but they were companies working under the least favourable conditions, and their operations covered a complete area which could be conveniently dealt with. Sir John Lubbock had put upon the paper an amendment to the motion, but in 1891 Sir John expressed the opinion that the Council was the proper body to control the water-supply, and that the enterprise would, in his opinion, prove remunerative. Birmingham owned its water-supply, and the result was that though the supply had been doubled, the cost had been reduced. The same sort of thing could be said of Liverpool, Leeds, Bradford, Belfast, and many other places.

Major Probyn seconded the resolution.

Sir John Lubbock, M.P., moved the following amendment:—

"That before assenting to the Water Bill, now before Parliament, the Finance Committee be instructed to report to the Council as to the probable effect upon the rate of the purchase of the water companies in the manner proposed in the Bills now before Parliament having regard to the resolution of the Council with reference to the necessity for an additional source of supply, and on the basis of repayment in the maximum period of sixty years."

After observing that he agreed that the question was a non-party one, he said he had never spoken in favour of the purchase of the undertakings of the water companies, though he had expressed himself in favour of the establishment of a new supply, and in favour of municipal control. He thought there would now be no doubt that 50,000,000l. was well within the sum that would be involved in the purchase of the companies' undertakings. Much was said about the late frost, but what had been the result of that visitation? The companies would now be put to the heavy cost of laying their mains at a lower depth; but if the companies had been purchased last year, that heavy cost would have had to be borne by the ratepayers.

Mr. Joseph Dimsdale seconded the amendment.

Mr. Beachcroft thought, having regard to the fact that the Council had jurisdiction over only 120 square miles of the 845 constituting the water area of the various companies, that the Moderate party was justified in their demand for more information.

Alderman Ritchie remarked that the Moderates were not opposed to the Council's Water Bills, provided they received the information that was necessary to enable them to judge whether those Bills were in the interests of the ratepayers of London.

On a division there voted: For the amendment 49; against it 67. A division on Mr. Benn's motion was then taken, with the result that 66 voted for it and 30 against.

Sanitary Condition of Bethnal Green.—The report of the Public Health and Housing Committee contained the following paragraph:—

"Complaint having been made by the Bethnal Green Sanitary Aid Committee of the Mansion House Council as to the alleged inadequacy of the sanitary staff of the Vestry of Bethnal Green, we decided, after correspondence with the Vestry, that the Medical Officer should report upon the sanitary condition and administration of the parish. An inquiry was thereupon made by Dr. Young, assistant Medical Officer of Health, and the Medical Officer in submitting to us Dr. Young's report, which discusses in detail the character of the district, points out that whereas in London as a whole there is one sanitary inspector to some 20,000 inhabitants, in Bethnal Green there is one sanitary inspector to some 25,000 inhabitants. But while the staff of inspectors in Bethnal Green is below the London average, if the district be compared with other districts in London in respect of conditions which make claim on a Sanitary Authority, it is found that these conditions more abundantly exist in Bethnal Green than in most other London districts. Thus the persons inhabiting one or two streets constitute Bethnal Green a larger proportion of the population than they do in two-thirds of the districts in London. The Medical Officer is satisfied, therefore, that the advice given by Dr. Young

that another inspector should be forthwith appointed, raising the total number of inspectors employed to six, deserves the approval of the Council. Beyond this the Medical Officer adds that his own experience of the district, obtained by a detailed inspection in 1887, and by familiarity with its conditions since he has held his present office, leads him to the conclusion that this number of inspectors, with sufficient clerical assistance, is the very smallest which will suffice for the administration of the district. The need of accommodation for persons during the disinfection of their rooms is also properly insisted upon by Dr. Young."

Other business having been transacted, the Council adjourned until after Easter.

Illustrations.

IZAACK WALTON MEMORIAL WINDOW, ST. DUNSTON'S, FLEET-STREET.

THIS window, which has been erected as a memorial to Izaak Walton, in the church of St. Dunstan-in-the-West, was unveiled on Friday last, by Mr. W. Baily, the Master of the Ironmongers' Company, of which Walton was a member nearly 300 years ago. It has been designed and executed by Messrs. Percy Bacon & Brothers.

The centre light of the window contains a full length figure of Walton, which is a portrait; and a smaller panel shows him seated at his library table, surrounded by books and trophies of his art. The two side-lights contain portraits of men whose lives he wrote, and of his great friend Thomas Ken, the author of the Morning and Evening Hymns. At the top of the left-hand light is Sir Henry Wotton, with his coat-of-arms and a view of Eton College, of which he was a one time Provost. Lower down is Bishop Ken and an elevation of Wells Cathedral.

In the lowest panel is George Herbert, the poet, and his church at Bemerton, depicted on a shield. At the top of the right-hand light is Dr. Donne, Dean of Old St. Paul's; beneath him the judicious Hooker, and his delightful little church in Old Wode, Barham, near Canterbury. The third panel depicts Bishop Sanderson.

Angels in the tracery hold scrolls of the Virtues. In the two side quarterfoils are blazoned the arms of St. Dunstan and of the Ironmongers' Company. Walton was a member of the latter and overseer of St. Dunstan's parish. The centre quarterfoil contains the intertwined monograms of Izaak Walton and Charles Cotton.

The putting up of the window has been partly due to the exertions of Mr. R. B. Marston, the editor of the *Fishing Gazette*, who suggested the scheme of the design, and has acted as Hon. Secretary and Treasurer to the memorial fund.

COMPETITION DESIGN FOR NEW BANK, HALIFAX.

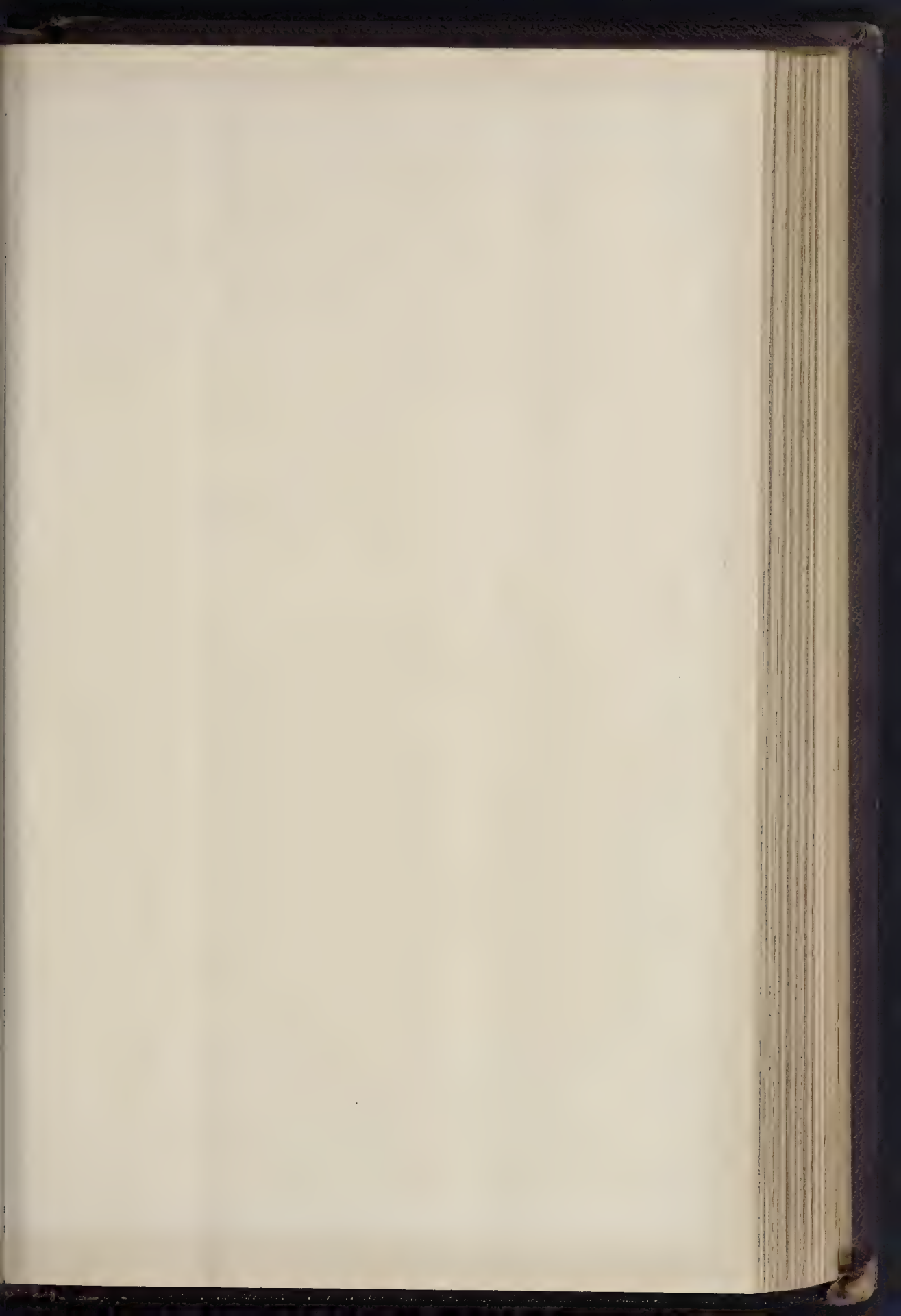
THIS is a design submitted in the recent competition for a new bank for the Halifax & Huddersfield Union Banking Company. It is by Mr. Herbert Athron, architect, of Doncaster. There seems to have been a reluctance to give competitors or the public any definite information as to the result of the competition, beyond returning their drawings to them. We publish this one because it shows some originality and novelty in the architectural treatment of a bank; and perhaps its publication may tend to elicit a little more information as to the competition.

It was intended that the walls should be faced with worked Huddersfield stone, with brick-battling, the plinth being grey granite, and the columns red polished granite. The walls of the entrance to be enriched with faience. The wall of the banking hall to have a panelled oak dado with coloured marble panels above, the arches and cornices being in faience. The roof of the low buildings would have been of fire-proof concrete, with Val de Travers asphaltic covering the roof of banking hall and entrance boards and covered with lead. The estimated cost of building, according to the architect's report so in with the drawings, was 15,353l.

MANSIONS, GREAT RUSSELL-STREET.

THESE buildings stand upon the site of eleven houses previously existing opposite the British Museum, and of a similar number facing Gilbert street at the back.

The whole of the buildings, although intended to be erected at different times and for separate leaseholders, and consequently varying considerably in plan, are united in the one complete





Russell's Mansion

opposite The British Museum. Nos 50 to 61

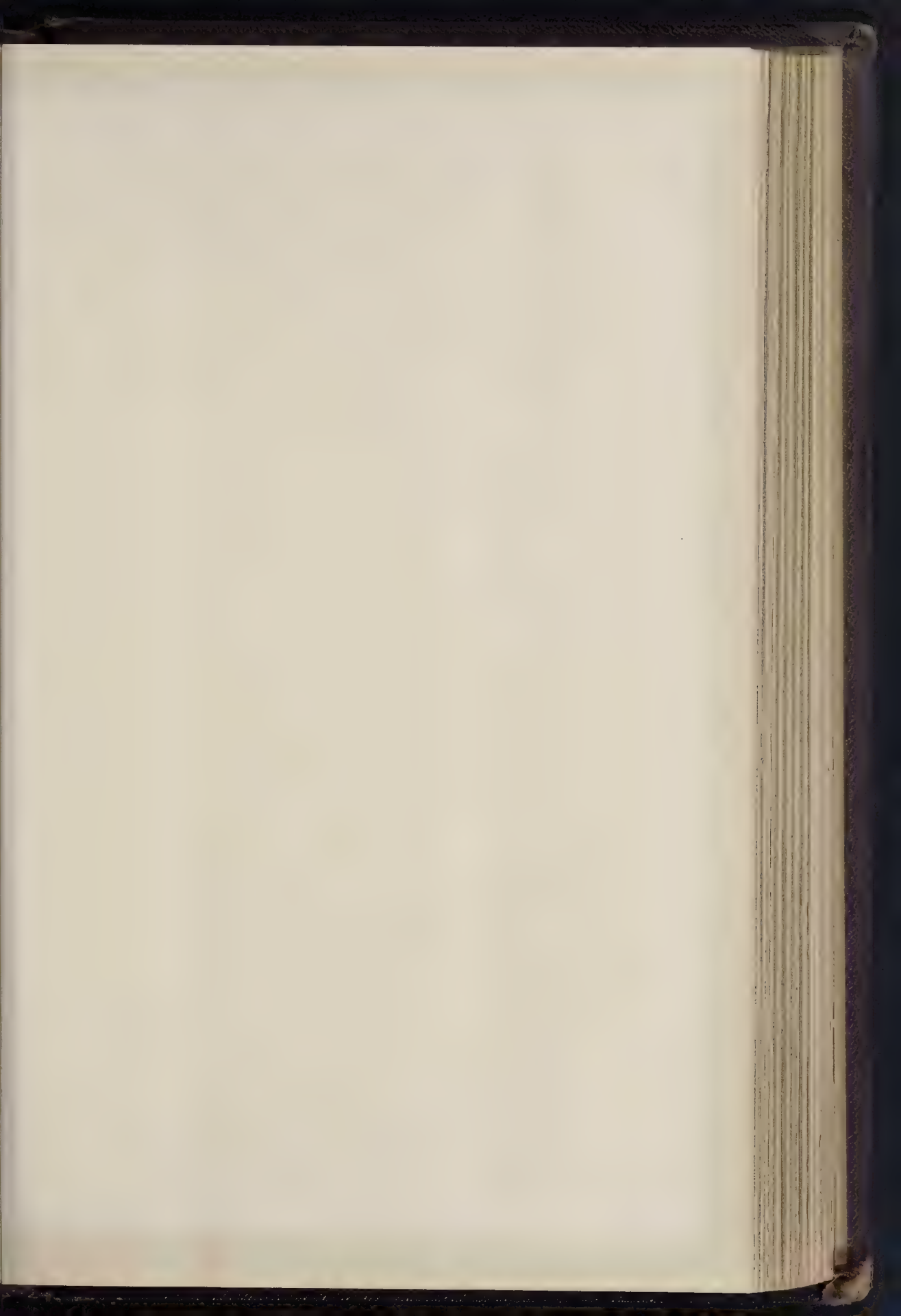


Montague Mansions

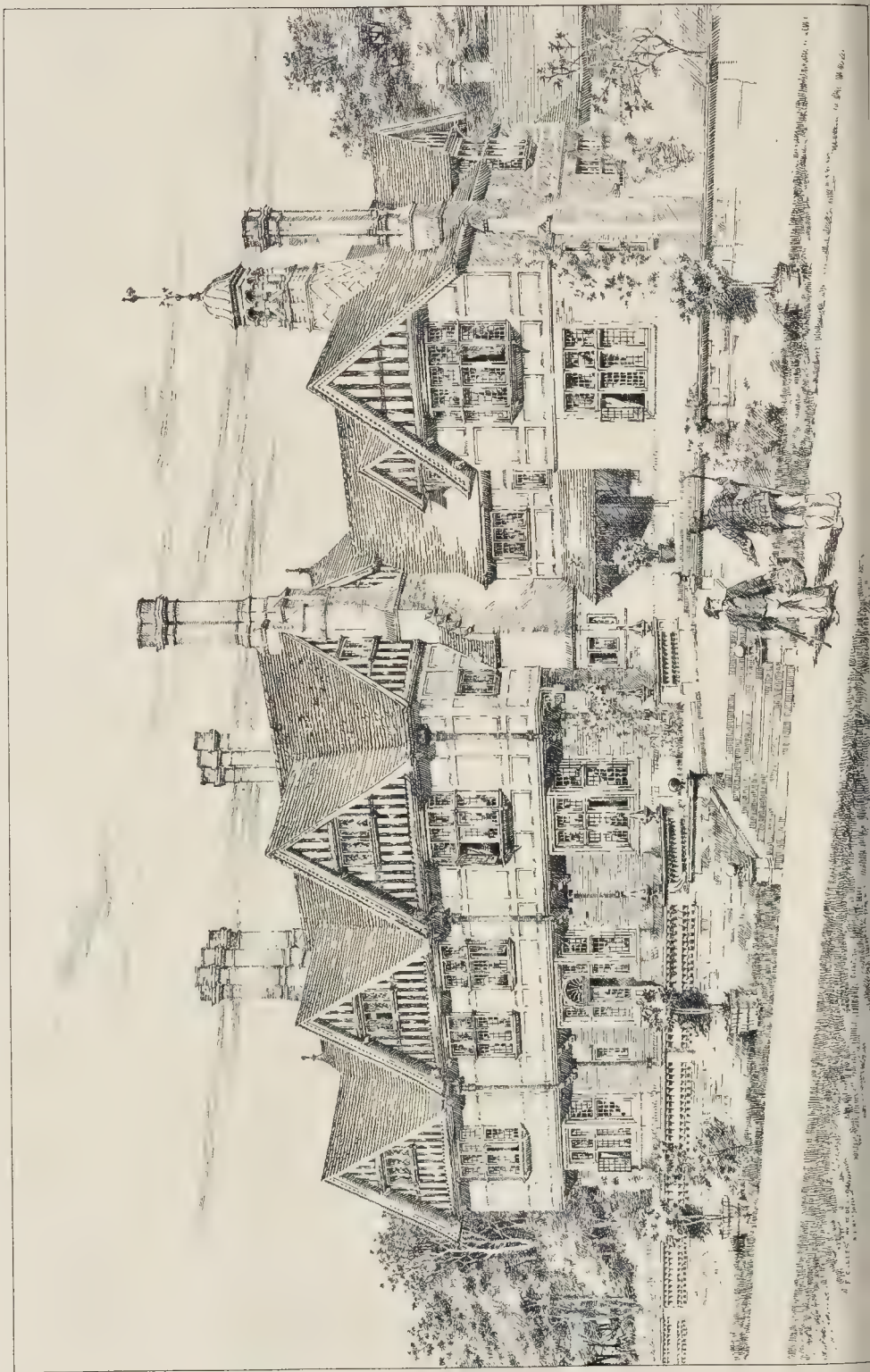
Street, Bloomsbury.

No. 51 & 59

W. J. & W. J. & W. J.

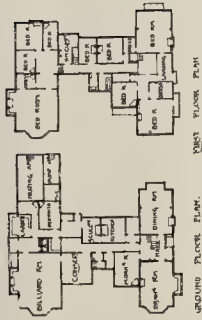


THE BUILDER. APRIL 13, 1895.

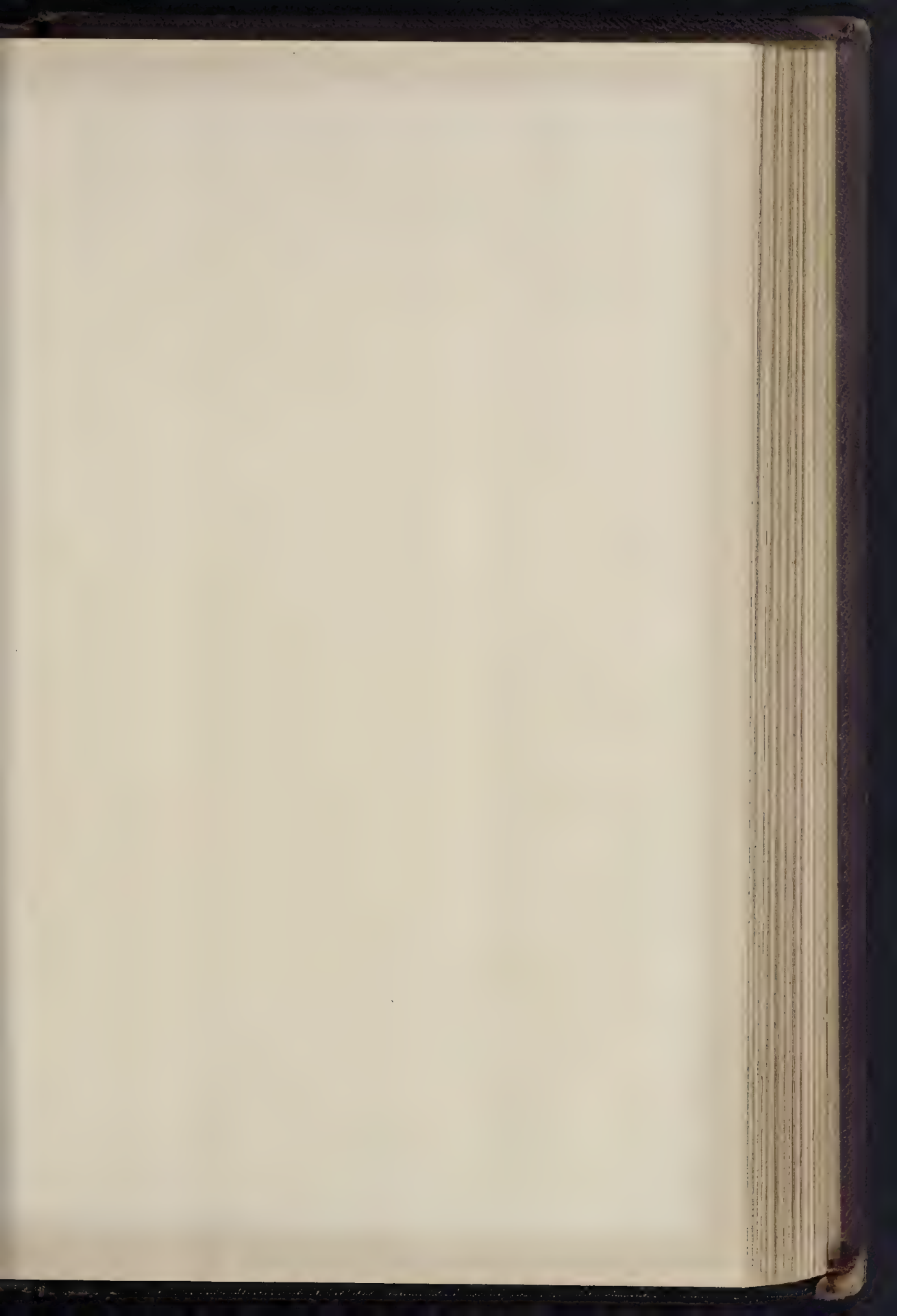


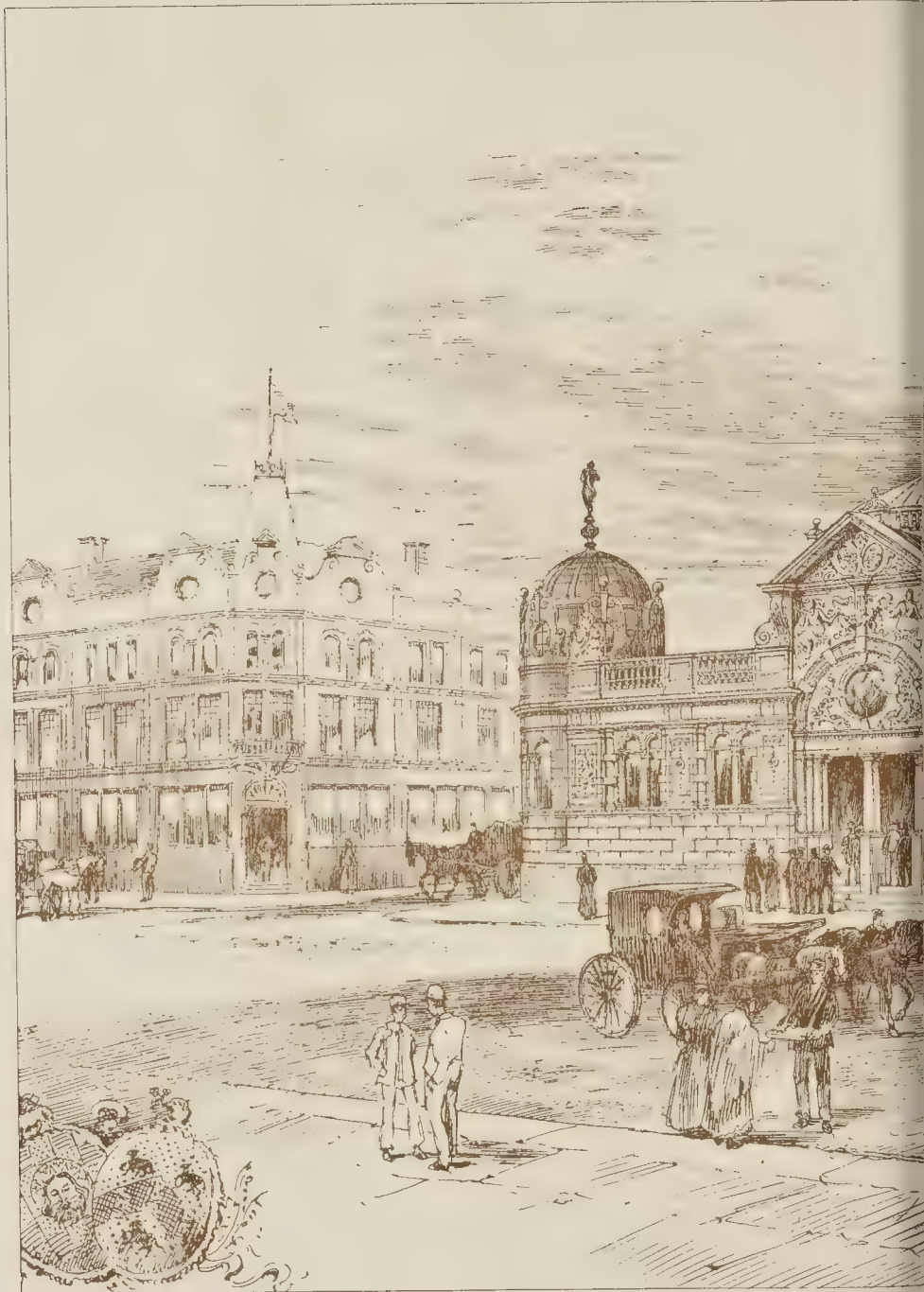
—A HOUSE AT RUDGWICK, SUSSEX.—

—FOR FREDERICK BARKER ESQ.— W H Harrison, Architect.



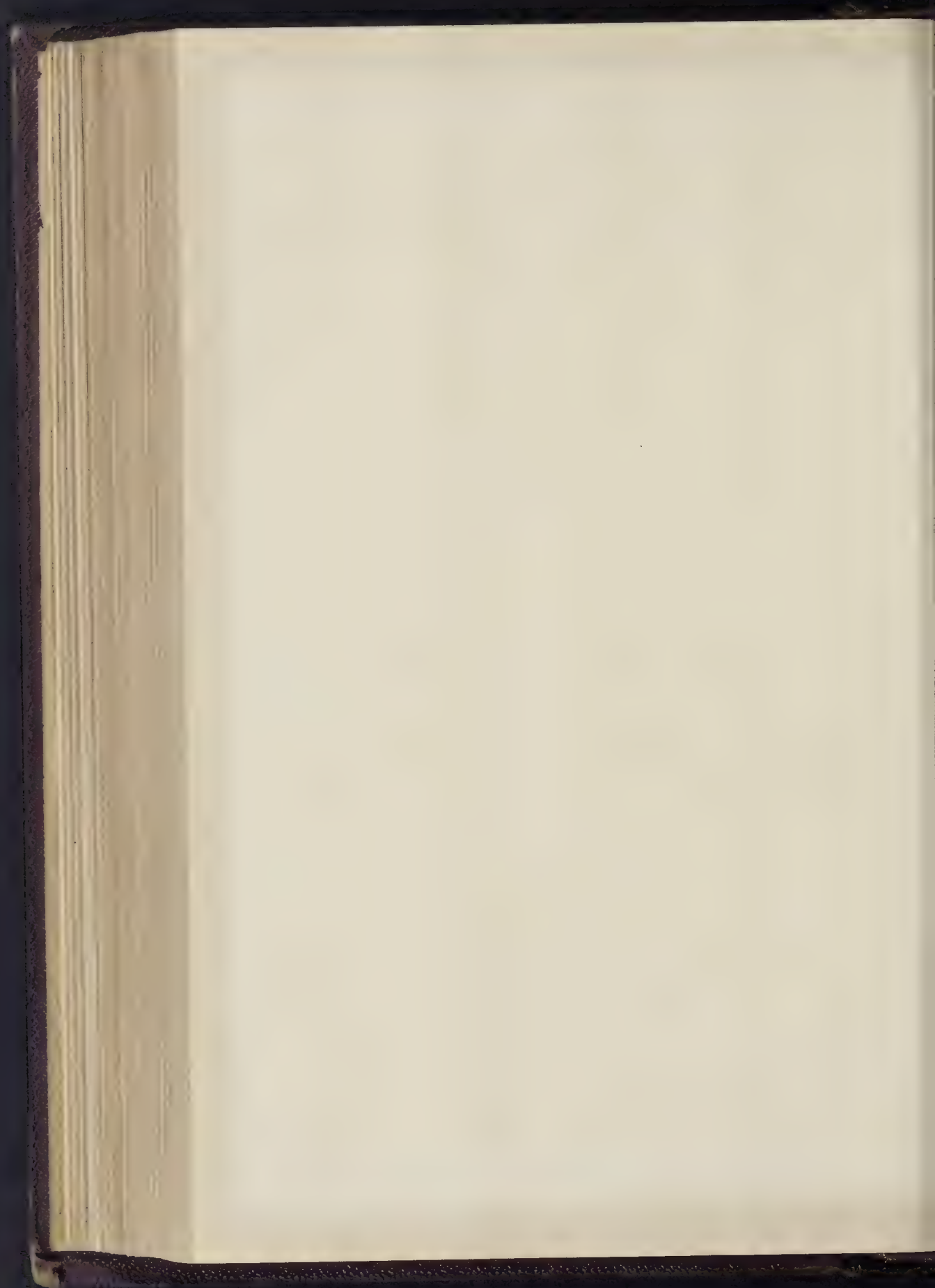
PRINTED BY J. H. COLEMAN, 15, MARK LANE, LONDON. ESTABLISHED 1841.

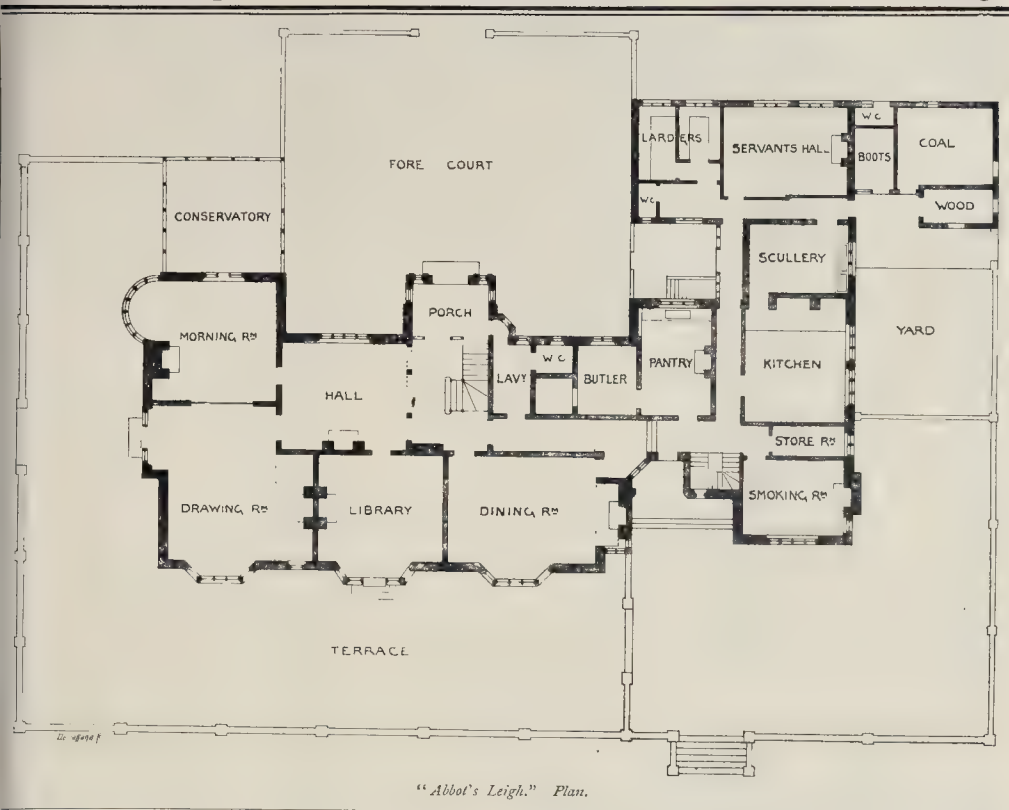




COMPETITION DESIGN FOR PRO







"Abbott's Leigh." Plan.

block design, the centre of which is now being carried out.

The arrangement of the plan generally is that of spacious internal courtyards with central staircase, and lifts placed between the front and back buildings, and so available for both. The trades entrances are at the back, connected with the basements only, and there is no other entrance into that street. Thus, some of the chief banqueting, billiard, and other rooms of a private hotel, and also many of the flats and residences, are able to derive their light and air direct from Gilbert-street facing south.

The construction is generally fire-resisting, the doors being by Homan & Rodgers, throughout composed of iron pottery and cement concrete. Portland-stone alone is used for the front and elsewhere, generally with red brick, some of it ornamental.

The chief features in the design are the oriel and bay windows projecting at the first floor level, and carried up some two, and others three stories higher.

The aim of the architect has been to give a dignified air to buildings which require ample windows, balconies, and projections necessary for the cheerful occupancy of first-class dwellings such as these, in floors and flats.

The position opposite the British Museum secures a grand open space in front, with ample light and air, and an outlook somewhat different from the mere side of a street.

The architect is Mr. C. Forster Hayward, and the drawing we reproduce was exhibited at the Royal Academy last year.

ABBOT'S LEIGH, HAYWARD'S HEATH.

This house is built on the edge of the high ground lying to the east of Hayward's Heath, and overlooks the wide valley that stretches to the Brighton downs. The principal rooms are consequently all arranged to face the south, except the morning-room, which is to serve also as a painting-room.

The house is built of brick, faced with red brick, with dressings of stone from the neighbouring quarries at Skegney's Hill. The upper part of the garden front is rough-cast in moulded panels. The chief feature of the interior is the

hall, which, with the principal staircase, is carried up through the two stories, an arcaded passage running round three sides to give access to the various rooms, the porch also being taken up the whole height of the building to afford space for the half-landings.

The drawing shows the house as it has been executed, with the exception of the terrace, which has ultimately been laid out level from end to end.

The architect is Mr. F. C. Lees, of London. The drawing was exhibited at the last Royal Academy exhibition.

The plan of the house is appended; that there is no scale to it is the fault of the architect, who sent it to us without any.

HOUSE AT RUDGWICK.

THIS house is built of red brick, half-timber work and red Broseley tiles, and was commenced on a small scale. When, however, the smaller house was nearly completed very considerable additions were made, including a billiard-room, gun-room, servants' hall, dairy, &c., engine-house for the electric lighting, stabling for seven horses; a pair of cottages, forming a lodge, and large vineries, greenhouses, winter garden, &c., were also erected.

The architect is Mr. W. H. Harrison, of Westminster; the contractor, Mr. F. T. Chinchin, of Kensal Green. The plant and electric lighting was supplied by Messrs. B. Verity & Sons, of King-street; and the greenhouses erected by Messrs. Rosser & Russell.

The drawing was included in the last Royal Academy Exhibition.

THE SANITARY INSPECTORS' ASSOCIATION.

At the April meeting of this Association, held on Saturday last at Carpenters' Hall, London Wall, an unusually large number of new members were elected, several representing Brighton, and others Worthing, Louth, St. Ives, Wisbeach, Southampton, Gloucester, and other important districts. The business on the programme included a paper by Mr. W. H. Grigg (Fulham Board) on "Some Reasons why Sanitary In-

spectors do not Occupy their Statutory Position," followed by discussion; a motion, of which Mr. Lightfoot had given notice, proposing a change in the constitution of the Council, which was negatived; and a resolution, proposed by Mr. Dee (Westminster), in favour of a Bill to be promoted in Parliament embodying a superannuation scheme for sanitary inspectors. It was also announced that the President of the Local Government Board had consented to receive a deputation from the Council of the Association on the subject of its claim to be represented on the new examining board proposed for sanitary inspectors.

Amongst the principal hindrances in the path of the sanitary inspector, Mr. Grigg placed want of unity, the presence among their body of incompetent men, and, above all, the attitude taken up by some of the medical officers of health towards sanitary inspectors. Some of these gentlemen, not content with performing the important duties assigned to them, assumed a position of domination over the sanitary inspectors which amounted in not a few cases to absolute oppression. They all knew the opinions of one leading Medical Officer of Health, who enjoined his brethren always to remember that "the Medical Officer of Health was the Chief Sanitary Inspector."

They were told by Dr. Willoughby in the "Health Officers' Pocket-Book" that the Officer of Health "must claim the subordination of the sanitary inspectors, who should act under his orders, report to him, and through him to the Board." It was not merely that the unwisdom and wastefulness was to be deprecated of allowing highly-paid officers to neglect their scientific duties, in order to undertake those more mechanical duties which fell to the sanitary inspectors, and which were efficiently performed by them at one third, one fourth, or one fifth of the medical officer's salary. This movement was especially mischievous, because of its tendency to perpetuate the bad old system of appointing as sanitary inspectors men who had no proper qualifications for the position. The post of sanitary inspector would again be regarded—as in some benighted places it still was regarded—as a position into which influential members of Local Boards could "job" acquaintances or relatives whose most essential qualification might be the ability "to do nothing successfully."

Men would still be taken from behind a counter or from a desk, weak, unpractical, inexperienced, and placed in charge of districts, with the inevitable result that they would remain years in leading-strings, and the position of commander would of course be then assumed by the Medical Officer of Health. The system followed in the Metropolis, of appointing chief inspectors with a staff of qualified inspectors to divide the work with them, was by far the best. Other points touched upon were "insecurity of tenure and insufficient salaries." One instance of the latter was given, where 70*l.* a year was paid (to include travelling expenses) to a man for part of his time in a district which consisted of 40 parishes, with a population of 30,000. Sanitary administration would never be completely effective until they could obtain the establishment of a Public Health Department of State, with a Cabinet Minister as President, and with sanitary officers responsible to the department, and holding the position of civil servants as much as the holders of offices under the Home or any other department. In conclusion, the lecturer said they often wished that circumstances would enable them to go hand-in-hand with other important bodies—such, for instance, as the Sanitary Institute, who had the same objects in view they themselves had, and to whom they must give that credit for honest intentions that they claimed for themselves.

The paper was well received, and after a discussion, in which Messrs. Brown, Scott, Addison, Young, Legg, Quelch, Kirk, Alexander, Lightfoot, Leon, Pettit, and the Chairman (Mr. H. Thomas) took part, a cordial vote of thanks was accorded. A vote of thanks was also accorded to Mr. Dee, for the very able exposition of his views on the subject of a superannuation scheme, in support of which a resolution was unanimously passed, instructing the Council to prepare a Bill, on the lines of that passed in 1890, to provide for the superannuation allowances for the members of the Police Force.

THE BUILDERS' CLERKS' BENEVOLENT INSTITUTION.

The seventeenth Annual Dinner of this Institution was held on Tuesday, in the King's Hall, Holborn Restaurant, Mr. Charles Wall, President, in the chair. The company numbered 352, among those present being Messrs. William Shepherd, Robert Freeman, A. Ritchie, R. Downs, B. Nightingale, E. Brooks, and Captain E. C. Roe.

The usual loyal and patriotic toasts having been duly honoured,

The Chairman proposed the toast of the evening, "The Builders' Clerks' Benevolent Institution." He said that their Institution was doing a good work, since it helped to support those builders' clerks who, through no fault of their own, had been unfortunate in life. The Institution had been in existence twenty-nine years, and was founded for the purpose of granting pensions of £25 per annum to necessitous clerks, and of £20 per annum to their widows, and for the maintenance and education of their orphan children, and for making grants of temporary relief. In the course of an earnest appeal for support for the Institution, the Chairman said that the income for last year had amounted to £808, the total being made up of £227 6*s.* 6*d.* in annual subscriptions, £326 in donations, £128 in dividends, and £125 moiety of legacy bequeathed to the Institution by the late Mr. Thomas Robinson. Pensions to the amount of £340 had been paid, as well as £36 10*s.* in sundry grants for temporary relief. An Institution which not only assisted unfortunate clerks, but their widows and orphans was, he considered, deserving of every sympathy.

Mr. W. R. Freeman, past President, then proposed the toast of the "Architects and Surveyors." In his opinion, he said, it was most desirable that builders' executives should come in touch with architects and surveyors, and he knew that architects had great sympathy with the work that they, as an Institution, were carrying on, yet he regretted to say that no representative of that profession was present that evening, though they had a gentleman representing the surveyors, Mr. Campbell, whose name he coupled with the toast.

Mr. Campbell having responded, Mr. R. Barratt proposed the toast of "The Master Builders," referring, in the course of his remarks, to the many difficulties which builders had to contend with at the present time. The toast was coupled with the name of Mr. R. Downs, who briefly responded.

Mr. F. S. Oldham then proposed the toast of

"The Merchants," coupled with the name of Mr. Alexander Ritchie, J.P., who replied, pointing out that one of the most regrettable incidents in connexion with institutions like the Builders' Clerks, was that many of the individuals who were the recipients of benefits had never subscribed to the funds. He hoped that builders' clerks would not fail to support the Institution which represented them, and so long as they had men in their ranks like those he saw around him, the merchants would not be behindhand with their assistance.

Mr. H. J. Wheatley, Secretary, then read the subscription list, which amounted to 27*l.* 7*s.*, including 2*l.* from the Chairman, and 10*l.* 10*s.* each from the Carpenters' Company, Mr. J. Randall, and Messrs. Mowlem & Co. The Chairman subsequently referred to the great help which he had received, since he had been their President, from their energetic Secretary, Mr. Wheatley, and the Committee.

Mr. E. Brooks, the Treasurer, next gave the toast of the "Past Presidents," coupled with the name of Mr. W. Shepherd, who responded.

The concluding toast was "The President," proposed by Mr. Shepherd. The Chairman having replied, the proceedings terminated.

COMPETITIONS.

INFECTIOUS DISEASES HOSPITAL, PENZANCE.—The plans sent in for competition for the new Infectious Diseases Hospital at Penzance, nearly seventy in number, are now on view in the Alverne Hall. It is understood that Mr. Aldwinckle has awarded the first premium to the design with the motto "Eclipse," and the second to that with the motto "Aspect." The designer of the "Eclipse" plan has evidently studied utility rather than æsthetic effect. His design provides for a very plain building, but it embodies the principles which are now held in most favour by authorities on hospital architecture; and it could, it is believed, be carried out for the amount which the Council have in view. Some of the designs are much more ornate and elaborate.

PENZANCE BUILDING TIDINGS.—TOWN HALL, BLACKPOOL.—The Committee of the Blackpool Corporation charged with the work of selection have decided to adopt the design for a new town hall submitted by Messrs. Woodhouse & Potts, of Bolton, awarding the second premium to Mr. A. Gilbertson, Liverpool, and the third to Mr. J. Lovell, London. The estimated cost of the building is 8,000*l.*

ARCHITECTURAL SOCIETIES.

EDINBURGH ARCHITECTURAL ASSOCIATION.—A meeting of the Edinburgh Architectural Association was held, on the 3rd inst., in the Royal Institution, Mound, Mr. W. W. Robertson, the President, in the chair. Mr. John Kinross, A.R.S.A., made a communication on St. Andrew's Priory. He gave it as his opinion that the evidence was amply sufficient to prove that the monastic buildings were commenced after the cathedral building was completed. Mr. Thomas Bonnar read a communication on "Some Notes on the Ancient Mural Decorative Art in Scotland." Dividing the subject into two divisions—the ecclesiastical and the secular periods—he said, of the first, that, owing to the ravages which left the ancient religious edifices of our country in a totally ruinous condition, there were only two examples known to him of ecclesiastical coloured work illustrating this phase of art in Scotland. The more important specimen was the groined roof of the crypt of Glasgow Cathedral. That remarkable and highly interesting piece of decorative work, although in a decayed condition, showed by its presence on the roof of that ancient structure—which dated back to the twelfth century—that the interiors of religious houses were highly decorated with ornamental forms, and that the use of rich colouring was prevalent in those early days of the Church in Scotland. The mullions that formed the groined arches of the roof were deeply moulded and filled in with full colouring of red, yellow, and white. The centre bosses were also tinted with similar colours, and there was evidence that the enriched carvings had been overlaid with gold. At the intersections of the groins and at the bases of the arches there were painted on the plastered stone arches richly twining ornamental scrolls representing conventional foliage, the prevailing tint being green. The drawing of the ornament exhibited great precision, while it retained much spirit in the flow of its lines, proclaiming it to be the work of a proficient artist. These particulars were noted

many years ago, but he was surprised and disappointed to find, on a recent visit, that not one vestige of the ancient work now remained. So thoroughly had it been obliterated that it was evident that the chisel had been employed to accomplish it—the worst act of Vandalism of ancient times. The other proof of colour being introduced on stone work was to be seen in Dryburgh Abbey within the chapel adjoining the one which lies the greatest of the romancists, Sir Walter Scott. Turning to the secular part of the subject, he said it was impossible to determine the probable date when this class of work was first used for interior decoration. The earliest dated ceiling extant was the Nunraw one, the year inscribed on which was 1461. Borthwick Castle, which dated from 1430, with its handsome hall and storied arched roof—the surface of which was plastered over at the present time—showed traces of both design and colour having been carried out on a most elaborate scale. Its treatment of motive bore some resemblance to the timber roof of the church of Largs, which dated from 1637. In depicting the family escutcheons on the ceilings, which had now become historical, the artists had clothed them in floriated compositions of grotesque masks and quaint ornament forms drawn in freehand, and throughout the composition a satirical humour underlay the motive. On the coats of arms, which were the main feature of the schemes, were painted the quarterings of many of our leading families, the medium employed being distemper. The characteristics of the art were Scottish, although the work of foreign artists might be observable, still they could recognise the individuality of native artists in the architecture of Falkland Palace, Linlithgow Palace, and Stirling Castle. The new empty niches above the gateway in the eastern side of the quadrangle of Linlithgow Palace were once occupied by statues of a Pope to represent the Church, a knight to indicate the gentry, and a working man to symbolise the commons, each having a scroll above his head, on which were inscribed a few words, the legend now irretrievably lost. That was gathered from the records of 1535, which further showed these statues, together with the group of the Salvation of the Virgin upon the other side of the quadrangle, and certain unicorns and a lion upon the outer gateway, were brilliantly painted. Reference was made to three ceilings—namely, that of the chapel of Falkland Palace and two in Holmwood Palace—which were decorated in the Heraldic style, evidently of English origin, and were probably the work of the Court official known by the name of the "Sergeant Painter"—to indicate what was recognisable as not being the work of Scotsmen, and so enable them to include the remaining specimens as purely national. There was a growing opinion in some quarters favourable to the renewal of this mode of painting, and those impressed with the idea of introducing such an attractive style of decoration into our ecclesiastical, civic, and domestic buildings should keep in view that the character of the design should especially bear the impress of native type. Mr. Kinross and Mr. Bonnar were given hearty votes of thanks for their communications.

CARLISLE ARCHITECTURAL, ENGINEERING AND SURVEYING ASSOCIATION.—On the 3rd inst. a lecture was delivered before this Association by Mr. R. G. Rogerson, C.E., on "Tachemetry or 'Rapid Surveying.'" The lecturer commenced by describing the various forms of tachemometer from the original forms of the instrument to its use at the present day, and said that insufficient advantage had been taken of the instrument in England, its use being almost entirely confined to foreign engineers who were remarkably expert in their application of it to surveying for engineering schemes, especially such as railways over rugged and mountainous country. The main principles of the tachemometer were then described, and the different peculiarities of each type of instrument. A detailed description of the operations necessary in the field was given, and specimens of field-books actually used by the author in connexion with survey work by the Pireus and Larissa Railway, together with surveys and sections plotted entirely from the notes, were shown. It was explained that though measurements of any altitude and length were still dependent on the range of the telescope, still errors increased in proportion to variations of altitude as well as horizontal distance. The use of special tables adapted to this work was explained, and a specially-constructed form of slide-rule for performing the calculations expeditiously. The use of the plane table and omnimeter was also described.

ARCHÆOLOGICAL SOCIETIES.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—On the 3rd inst. a meeting of this Association was held, Mr. C. H. Compton in the chair, when a paper was read by Mr. E. P. Loftus Brock, F.S.A., on the excavation of a Roman villa in the Wadfield, near Sudely Castle, Gloucestershire. This he has recently been superintending on behalf of Mrs. Dent, of Sudely Castle, to whose liberality archaeologists are greatly indebted for important discoveries in this neighbourhood, notably the well-known and more extensive Roman villa in Spoonley Wood, also on the Castle estate, and somewhat less than two miles distant. The district surrounding Winchcombe, which is the nearest town, is far away from any known Roman station, and is, apparently, an unlikely spot in which to find Roman remains. These discoveries, therefore, are of great interest and value. The ground-plan of the villa has been entirely uncovered, and exhibits a perfect Roman villa, covering an area of about 140 ft. by 110 ft., forming a centre and two wings, enclosing a courtyard about 34 ft. wide. The plan presents considerable resemblance to the more extensive villa in Spoonley Wood. The site selected by the builders is an unusual one, being about half-way up the steep slope of a hill some 400 ft. high, having an incline of about 1 ft. in 5 ft. The apartments are set out with great regularity, and at right-angles, but the walls vary considerably in thickness. The material is the coarse oolite stone of the locality, and the mortar is made of poor chalk lime. The walls have been plastered internally, and remains of coloured decoration were met with, some being exceedingly brilliant, particularly the Pompeian red. Some traces of a moulded stone plinth and a capital and parts of a cornice were discovered, also some pottery of buff and black colours and a few fragments of Samian ware. A coin of Arcadius and a brass coin of considerably earlier date, with a few others of less interest, were amongst the "finds," and are now preserved at Sudely Castle. Mrs. Dent has had the more important parts of the villa carefully protected from the elements, but the rest has again been covered in. Some portions of a pavement of red tesserae and a hypocaust with several pylæ of brick were found *in situ*. The paper was clearly illustrated by a carefully-drawn plan, and a plan of the Spoonley Wood villa was exhibited for comparison. Upon the motion of the chairman, the meeting cordially acknowledged that the thanks of all archaeologists were due to Mrs. Dent for her liberality and public spirit, and for the services she had thereby rendered to archaeology.

ENGINEERING SOCIETIES.

THE INSTITUTION OF JUNIOR ENGINEERS.—At the meeting of this Institution, held at the Westminster Palace Hotel, on the 5th inst., the Chairman, Mr. H. J. Young, presiding, a paper on "The Study of Alloys" was read by Mr. Walter G. McMillan, Lecturer on Metallurgy in the Mason College, Birmingham. The author gave an account of some of the recent researches of Roberts-Austen, Wright, Heycock, and Neville, and many others on the nature and constitution of alloys. He showed how some pairs of metals formed homogeneous mixtures, which might be kept for hours in a fused condition unchanged, whilst others rapidly separated into layers; and he described the influence of increasing proportions of a third metal upon the immiscible pairs. It was then shown how mixtures, uniform when fused, might give a non-homogeneous metal when solidified, which was explained by referring to the tendency to form "entetic" alloys of definite composition, with lower fusing points than those of the metals used, so that one constituent after another crystallised out from the mass of fluid metal, leaving at last the entetic alloy to solidify in the spaces around the separated solid particles. The author instanced various cases of segregation and liquation, both in metallic alloys, and in steel and iron; and showed not only how the cellular structure of solidified alloys can be seen with the aid of a microscope, but how certain pre-existing metallic compounds may often be isolated, by attacking metals with suitable solvents. Evidence of many kinds was then examined as to the nature of alloys; and it was seen that, whilst the character and behaviour of a few alloys justified the assumption that they were true chemical compounds, by far the largest majority appeared to be merely mixtures, or solidified solutions of metals one in another. But, since the mechanical properties of nearly all the alloys, for which any claim to chemical union may

be advanced, are in the last degree unsatisfactory, the proposition to mix alloys in atomic proportion, which had often been made, did not recommend itself, even if it were possible (having regard to the irregular loss of metals in melting) to obtain a metal of precisely the desired composition. In conclusion, the author urged the necessity for precision and system in reporting results, and regretted the use of trade names, which (even if in certain cases justifiable) were misleading to the lay mind, and tended to produce great confusion in the literature of the subject, because there was no certainty as to the meaning of an author, who merely employed such a term, without giving an analysis of the mixture. As knowledge advanced, engineers would require to know the composition of the alloys in the market, that they might be able to discriminate for themselves their fitness for the required purpose.

Correspondence.

To the Editor of THE BUILDER.

CARDIFF, SOUTH WALES, AND MONMOUTHSHIRE ARCHITECTS' SOCIETY.

SIR,—The opportunity of closing this discussion in your columns, which you offer me, suggests that but small occasion remains for my saying more here. Indeed, the last letter of the local President discloses of its own accord, quite enough indication of the character and "true inwardness" of the whole affair. And except for the necessity which the following makes evident, I should stop here.

The local President, however, selects one building of mine, and gives currency to certain injurious rumours respecting its alleged excessive cost.

It would be right and judicious for a member of, say, the legal profession to publicly suggest of another, "he employed expensive counsel in the first part of his case, and that is sufficient excuse for our petitioning to take its future conduct out of his hands," or for a physician, with similar delicacy and fairness, to put into print—"he did not entirely cure a certain complicated case, and therefore he does not deserve to get another patient": if those methods would be reasonably tolerated in their respective circles, or anywhere else, then our local President's notions of good form—when taking the responsible office of spokesman for others—might, perhaps, serve to score a point, that is, if his statement about such excessive cost happened to be true. But it is quite untrue; and this contradiction deals not with some mere quibble of a hundred pounds or so, but with thousands, in the case of each of the sums which he subscribes his name to.

It is clear that this whole affair should go to the Royal Institute of British Architects, for when an allied society (ostensibly placed in a high local position in matters professional) is misdirected, whether from mere blundering or less worthy motives, it becomes a standing menace, instead of an aid, to respectable practice and its wrong-doing demands a spirited resistance from those who may be injured by it. Hence, I previously directed the local President's attention to the Institute, a possibility for avoidance of graver troubles. But in view of his indecisive handling of that suggestion, I now finally urge him to let no suspicion of evasion stand between him and his duty to the office he holds. Thus the very vexed questions arising from local members' action (publicly declared by myself and others to be unprofessional and unjustified) may perhaps be elucidated for general future guidance and benefit even outside the present case.

EDWIN SEWARD.

Cardiff, April 8th, 1895.

The Student's Column.

BRICKS AND TERRA-COTTA.—XV.

DURABILITY OF TERRA-COTTA.

MUCH of what has been said respecting the durability of bricks applies also to terra-cotta, but there are certain additional points for consideration. Of necessity greater care is taken in the preparation of the earths of which it is made, than with bricks; and the burning is also carried out with extreme carefulness. It is difficult, however, to lay down any general laws relating to the weathering of the material, as there are so many kinds of it. The statement is frequently made that terra-cotta is well-nigh imperishable, and as proof thereof the present condition of Assyrian and other ancient varieties is often quoted. As well might one point to the ancient Egyptian obelisks, still standing in the land of the Pharaohs, as instances of the durability of hornblende granite, of which some of them are made. Such materials in such a climate as obtains in the interior of countries

bordering on the south-easternmost portion of the Mediterranean are practically unaffected, and so, for the matter of that, is the sun-dried mud of the hut of the *fellahin*. Expose the same materials—the terra-cotta, the hornblende granite, and the sun-dried mud—to the rigours of British climate; how differently they behave. No, it sounds well to quote the durability of ancient terra-cotta made of Eastern earths; but what we want to know is, whether English terra-cotta, made of native soil, and in teeth of keen competition, stands well; whether the English manufacturer, under existing conditions of labour, exactions as to tint, rapidity of delivery, and a host of other impedimenta, turns out durable material? Without being personal, it is impossible for us to indicate which firms make good and durable terra-cotta and which do not.

Terra-cotta may be regarded in the light of a material suitable for the elucidation of what some might be pleased to call art, including groups of figures, flowers, &c.; whilst it may also, on the other hand, merely imply species of moulded bricks and blocks. Some of it is unquestionably very durable, much more so than any of the aqueous group of building stones; but a large proportion is a most unsatisfactory material, and not more durable than the worst description of stock bricks. The selection of suitable earths in the first place no doubt exerts considerable influence on the durability of the material, which no amount of careful firing can altogether displace. Terra-cotta building blocks, as everyone knows, are hollow in the interior. The makers' difficulty is in the employment of certain kinds of earth, mixed together, or rarely of one kind only, which shall shrink uniformly, without twisting or bending when subjected to the firing process. A principal aim is to use raw materials that contract as little as possible, and the precise amount of contraction, however small, must be capable of prediction beforehand. Suppose a block to be made of inferior, or of badly-prepared earth, it does not shrink uniformly, and it is incapable of making a good bond when built up. It is subjected to unequal pressure in the wall by reason of the side of one of its faces, perhaps, being longer than another. Cracks are produced and decay is set up, whilst the general strength of the wall is impaired. The interior of the block frequently being filled with all sorts of rubbish, bound together by not the best quality cement, a great deal of the actual strain in the wall comes on the thin shell of terra-cotta alone—that is, in the construction of a large number of terra-cotta buildings. Any previously hidden, or incipiently developed flaws then make their appearance, and it may be that the facilities thus afforded to percolating moisture tend to decompose the contents of the block, and to bring certain chemical compounds to the surface, promoting decay and disfigurement.

The student must be cautious, however, in discriminating between terra-cotta which is bad by decomposition of its substance throughout, and that which is merely decomposed on a thin surface film. Many manufacturers, anxious to present a good tint, subject the blocks to what is technically called a "dipping" process. In such cases the bulk of the material may be durable enough, but the film due to "dipping" is apt to peel off. The fact is that a specially prepared argillaceous substance is applied to the surface of such blocks, which substance neither expands nor contracts in the same ratio as the shell, when fired. The result is the creation of planes of weakness between the film and the main shell which soon weather out, and the surface becomes mottled by the former peeling off. Where efflorescence takes place the film may be "blistered."

The foregoing observations are not applicable to the best class of terra-cotta. In this the surface of the block is not "doctored" to produce requisite shades of colour—the shell may be broken to test the fact. The tint is produced by firing the prepared earths as a whole, and may be induced by the admixture of colouring ingredients, or, rarely, by the natural raw clays. Such terra-cotta is usually of an extremely durable description, it is not very absorbent, and is proof to the attack of the most powerful acids found in the atmosphere. It does not readily become discoloured, and save in niches, ornamental projections, and the like, any soot that may feel inclined to lodge is washed away by the first downpour of rain. Thus the surface of a terra-cotta building generally looks clean and new, whilst it lacks the beautiful tones characteristic of the weathering of the softer, and often less durable, freestones. We have no desire, however, to institute a rigorous comparison between the

natural and the artificial product, each has its own merits and drawbacks.

The durability of terra-cotta is sometimes affected by the careless way in which the cement placed in the interior of blocks is mixed, and by the general inferiority of the cement itself. The latter may under favourable circumstances swell out and crack the shell; such an occurrence, however, is of comparative rarity, and it is often difficult to say whether the flaws might not equally well have been produced by uneven strains in the wall of the building.

Efflorescence.

The cause of the appearance of white incrustations on bricks and terra-cotta which usually go by the name of "efflorescence," is an ever-recurring question. The subject has been carefully investigated on several occasions with reference to a few kinds of both bricks and terra-cotta, but it has never been treated as a whole in detail. Experiments, spread over a number of years, and carried out on the best-known varieties, are badly wanted. So far as the matter has been inquired into, we are able to state that the incrustations are of many kinds, and they are due to various causes. It was necessary to mention this, as the general impression seems to be that they are of one character only, and are due to one cause.

Architects must often have been puzzled when using one class of brick from the same maker to account for the circumstance that it "effloresces" in one locality and not in another. In one building, moreover, the incrustation may be of a fairly permanent character for years, whilst in another it may only be of a temporary nature, but re-appearing at intervals. Different sides of the same building may be affected in different degree. Pass a building this week and notice the brickwork literally covered by this unpleasant coat of white substance; and revisit the spot a week hence to notice that not a vestige of the covering remains. The incrustations, therefore, behave in a most erratic manner, and the matter is of sufficient importance to demand the most painstaking scientific investigation.

As might naturally be supposed, all possible combinations of circumstances have been blamed in connexion with the incrustations. The composition of the brick has been taken to task, the method of its burning criticised, the character of the mortar in which it is set terribly stigmatised, the damp foundations complained of, and so on; but one set of combinations of purely local origin, and which is responsible, it seems to us, for most of the mischief created, has never been seriously taken into account. We allude to the chemical composition of the impurities in the atmosphere in the immediate vicinity of the buildings affected, in its effects on the materials mentioned. As the atmosphere differs according to locality, so, it is conceivable, does the character of the incrustation also. Prevailing wind currents assist in the work. Many of our readers have, doubtless, noticed that certain freestones built into an incrustated brick wall, or near by, are covered by the "efflorescence" as well as the brickwork or terra-cotta. Now, it is, of course, nonsense to suggest that the atmosphere has had much to do with it in this case. Its nature in at least two instances that have lately come under our notice in these circumstances is of vegetable origin, the plants resembling "moulds." That is very different from an incrustation of mineral origin, such as is usually found both on bricks and stone, but then the mineral matter is of several kinds and occurs in many forms. Here it may simulate the appearance of the "moulds" referred to, there it is arranged in stellar-like groups, composed of acicular filaments radiating from a central point; frequently it is truly crystalline, the incrustation consisting entirely of crystals, and occasionally it is a powdery amorphous substance. The real state of the covering can only be ascertained by aid of the microscope, and a high power is sometimes required.

The foregoing comprise all the varieties of "efflorescence" that we have been able to examine, but a more extended investigation will most probably show that many other forms exist. We can prove, at any rate to our own satisfaction, that the incrustations may be due to the growth of low forms of plant-life dependent in no way, except for foothold, on the chemical or mineralogical nature of the bricks, terra-cotta, or stone on which they are found; they may arise from chemical reactions set up by local impurities in the atmosphere on the mineral matter of the substance encrusted, producing either pure crystals, or amorphous, earthy dust. The incrustation, when of mineral origin, may be quite superficial in

character, rapidly formed and easily washed away by a shower of rain; or it may be of a more serious kind, corroding the surface and apparently entering into the composition of the brick, when it is very difficult to get rid of, and tends to decay, or blister the brick.

As to how far the mortar may exert any influence in causing "efflorescence" we prefer to let that phase of the subject rest for the moment; it is sufficient to note that the kinds of bricks most seriously complained of, are often found to be encrusted before leaving the brickyard, where no suspicion can attach to mortar.

It is a mistake to suppose that all bricks "effloresce," it would appear that those which are hard-burnt are least affected, though we could point to exceptions to this rule where salt-glazing has been used. A vitreous brick, and especially a non-porous one with a comparatively smooth facing is, perhaps, the best all round for resisting the formation, or discouraging the development of incrustations. In the near future it may be shown that bacteria are active agents in the production of these unsightly appearances.

In connexion with this subject of the efflorescence on bricks, see the "Note" on page 278 of this issue.

OBITUARY.

MR. JOHN BUCHAN.—We regret to announce the death of Mr. John Buchan, A.M.Inst.C.E., which took place at Plymouth on March 20. In June last Mr. Buchan found the state of his health necessitated his resignation of the City Engineering of Norwich. Mr. Buchan was a son of the late Captain D. Ayle Buchan, R.N., of Plymouth, who formed one of Ross's Arctic Expedition, commissioned to, if possible, find and relieve Sir John Franklin. Mr. Buchan was educated at North Hill Grammar School, and articled in 1873 to the late Mr. Robert Hodge, C.E., Borough Engineer of Plymouth. On the expiration of his articles he was appointed on the staff of the Borough Engineer of St. Helen's, Lancs., and later as Assistant Borough Engineer of Plymouth, which appointment he resigned to become Borough Engineer of Grimsby. In 1892 he was elected City Engineer, Architect, and Surveyor of Norwich. He was buried at Plymouth Cemetery on the 23rd ult. At a Council meeting, on the 26th ult., of the Norwich City Council, on the motion of the Mayor, it was resolved that a letter of condolence should be sent to the relatives of the late Mr. Buchan.

GENERAL BUILDING NEWS.

BATHS AND WASHINGHOUSES, SOUTHWARK.—New baths and washhouses in Lavington-street, Southwark, were opened on the 6th inst. by Sir F. Wigan. The buildings have been erected from the designs of Mr. F. B. Smith by Messrs. D. Charteris & Co. The first-class swimming-bath has a water-space of 100 ft. by 30 ft., with a gallery round the sides. Boxes are divided by slate slabs. The depth of the water is graduated from 6 ft. 6 in. to 3 ft. 6 in., as in the second-class bath, which has a water-space of 70 ft. by 30 ft. First and second-class private baths are also provided. There is accommodation for twenty-four washers in the washhouses, and each woman has a compartment with three subdivisions. The first-class swimming-bath is fitted with a portable floor, carried on trestles, thus providing a hall, capable of seating 1,200 persons, for meetings, entertainments, &c., during the winter months, when not in use as a bath. The cost of the building, which covers an area of 16,260 superficial feet, with fittings, is 30,000.

SCHOOLS, OVERSTONE, NORTHAMPTONSHIRE.—New schools have just been erected at Overstone. Local stone, with Harlestone stone dressings, has been used for walls, with oak timber framing in the gables, &c. The roofs are covered with Broseley tiles. Selected pitch-pine has been used for roof of schools and fittings throughout. The windows have wrought-iron casements and leaded lights, and the buildings throughout are warmed and ventilated by means of Shorland's patent Manchester grates. The work has been carried out by the Estate workmen from plans and under the superintendence of Mr. J. Mander, the Estate architect.

CHURCH, NEWCASTLE.—A new inst., a new church, which has been built at Park-road, Newcastle, was opened. Under the church, and on a level with Cambridge-street, is a school-room, with large platform, and three class-rooms. The church and school were designed by Messrs. Walker & Collinson, and built by Mr. Mauchlen, of Newcastle, under the supervision of Mr. Mander.

WORKING MEN'S INSTITUTE, ST. JUST, CORNWALL.—A Working Men's Club and Institute has just been erected at St. Just by Mr. Bolitho, M.P. The building occupies a site in Cape Cornwall-street. Along the front and level with the upper floor a balcony runs from end to end. On the upper floor is the club room. There are also retiring and caretaker's rooms on the upper floor. On the ground floor is the reading-room, the library, and the

kitchen. Behind the main building and communicating with it is the billiard-room. Messrs. R. H. Roberts and W. Marks, St. Just, were the contractors for the building, which has been built from plans prepared by Mr. O. Caldwell.

BOARD SCHOOL, STARBEEK, YORKSHIRE.—Mr. John Barber, chairman of the Bolton School Board, has opened a new Board School on the 6th inst., of the first Board School for the district, at Starbeek. The school has been planned in two departments, mixed and infants. Each department will have a central hall, with surrounding class-rooms communicating with it by glazed screens and doors. Each class-room will accommodate 60 scholars, and the school will give a total accommodation for 600. The Tudor style of architecture has been adopted. The building will be constructed of Pateley stone, with ashlar dressings. The cost of land, buildings, and furnishing will reach about £10,000. Messrs. H. & E. Marten, of Harrogate and Bradford, are the architects.

WESLEYAN CHAPEL, ARTHINGTON, YORKSHIRE.—On the 4th inst. a new Wesleyan Chapel was opened at Arthington. Shipley stone has been used, with ashlar stone dressings, lined with brick. The whole of the work in the interior of the chapel is of polished pitch-pine, and the windows are in stained glass. Accommodation is provided for 150 worshippers. Adjoining the chapel there is a schoolroom, which will hold about sixty scholars, and a vestry; and behind these buildings is a house for a caretaker. The heating is by means of hot-water apparatus. Messrs. Rhodes Brothers, Shipley, were the principal contractors. The total cost will be about 1,400. The architect was Mr. W. H. Bevers, of Leeds.

NEW ALMSHOUSES AT HUNSLLET, YORKSHIRE.—It is proposed to erect new almshouses at Hunsllet. The necessary land has been secured at Woodhouse Hill, Hunsllet, and the plans have been prepared by Mr. John E. Leak, architect, Hunsllet, and are now before the Building Clauses Committee of the Leeds Corporation, awaiting their approval. According to Mr. Leak's scheme, each house will contain on the ground floor a living-room, scullery, pantry, coal-place, and out-house, with a back yard, while on the second floor there will be two bed-rooms.

NEW SCHOOL CHAPEL AT SEDBROUGH.—The tender of Messrs. Brassington Bros. & Corney, builders, Sedburgh, has been accepted for these works, including ashlar lining. The amount of the tender was £4,098. Messrs. Paley, Austin, & Paley, Lancaster, are the architects.

SANITARY AND ENGINEERING NEWS.

BUCKINGHAM SEWERAGE.—The Buckingham Town Council, at their meeting held on the 1st inst., resolved to adopt the recommendation of the Committee to carry out a pumping scheme of sewerage for the town, and to instruct Mr. H. Bertram Nichols, C.E., of Birmingham, to prepare the plans, in order to carry out the arrangement entered into by Mr. Higgins, Q.C., on behalf of the Council, so that the scheme might be submitted to the Grand Junction Canal Company by the 17th inst.

SOUTHAMPTON MAIN DRAINAGE.—Mr. F. H. Tulloch, Local Government Inspector, held an inquiry at the Municipal Offices, Southampton, on the 4th inst., concerning the application of the Corporation to borrow the sum of 40,000, for the main drainage and sewage disposal. The scheme, proposed by the Borough Engineer, Mr. W. B. G. Bennett, C.E., was fully explained by him. It embraces the main drainage of the eastern districts of the town, comprising 541 acres, with a population of 44,700. The object of the scheme is to prevent the pollution of the River Itchen, and to convey the sewage from its present outlet to disposal works to be constructed near the mouth of the river. Several miles of egg-shaped brick sewers and stoneware tubular pipe-drains are to be laid, also an extensive and separate system of surface drains, supplemented by the existing sewers, which will be retained as outfall sewers for the rainfall only, the house-drainage to be disconnected from the same, and reconnected to the new sewers, which are each to be laid with gradients ensuring self-cleansing velocities. In two low-lying districts the sewage will be lifted by Shone's Pneumatic Ejectors, placed in brick-chambers under the roadway. For the purpose of ventilation it is intended to erect at the heads of each sewer a new sewer, approved sewer-gas destructor, in ornamental cast-iron columns. The sewage, on its arrival at the disposal works, will pass through strainers to three direct-acting engines, and pumps of the Worthington type, chemically dosed, and discharged into precipitation tanks, twelve in number, situated at a level to permit of the effluent being run off at all times of the tide. Automatic chemical mixing and feeding machinery to be provided and driven by an independent engine. The precipitated sludge will be drawn from the tanks through a sealed main, lifted by Shone's ejectors into a sludge reservoir, further precipitated and run into iron receivers, from which it will be forced into filter-presses and discharged in cake. Four new cells are to be added to the existing reeking machinery to be added to the existing filter-presses for the purpose of supplementing the steam power which it is intended to use for compressing air for operating the Shone's ejectors and the Worthington pumps, also for the filter-presses.

The destructor has for the past eight years supplied the power for working the first installation of the Shone's system laid in connexion with existing sewage disposal works of other districts. The new buildings will consist of an engine and dress house, and a living-room, &c. There was no opposition, and the inquiry terminated, after which the inspector viewed the site of the works. The Corporation recently applied for and obtained an extension of the borough boundaries, comprising the whole of the district of Shirley and Freeton, and part of Millbrook on the west, and Bitterne Park on the east, thus increasing the population by nearly 20,000, and the area by nearly 2,000 acres.

FORESHORE IMPROVEMENTS AND ELECTRIC LIGHTING AT SOUTHPORT.—Mr. Rienzi Walton held an inquiry on the 3rd inst. at Southport Town Hall, on behalf of the Local Government Board, into two applications for borrowing powers made by the Southport Town Council. The first was in respect to a sum for foreshore improvements. For the construction of a marine drive, and the connexion of the two lakes, the Corporation had been empowered to borrow 20,000. They now proposed to lengthen and raise the bridge over the junction of the lakes, so as to make one continuous slope from the promenade, and this and other work which the alteration involved would cost 8,500, for which they now applied. The second application related to the electric lighting system, which was put into operation last November. Already more than 2,000 lamps were wired on the mains more than the generating plant could really supply, and the Electric Lighting Committee proposed to extend the buildings and power of the station to meet the present growing demand, and to enable them to tap the residential district of Hesketh Park. The cost of this work was estimated at 10,000, and over and above the balance in hand they applied for power to borrow 22,000, in addition to 3,500, for street lighting, making 15,500. There was no opposition to either application.

BOWNESS-ON-WINDERMERE SEWERAGE.—Messrs. Lomax & Lomax, Civil Engineers, of Manchester, have received instructions from the Bowness-on-Windermere Urban District Council to prepare a scheme of sewerage and sewerage disposal for the district. At the Appleby Assizes the late Local Board was defeated in an action brought against them for pollution of the lake. After many enquiries the Bowness Council has now practically decided to carry out the "International" system of sewage purification as a remedy for the evils complained of.

FOREIGN AND COLONIAL.

FRANCE.—According to the scheme of M. Bouvard for the 1900 Exhibition, which has been adopted by the Municipal Committee, the new Palais des Beaux-Arts, which will replace the Palais de l'Industrie, will consist of a main block bordering the avenue, 100 metres wide, which will start from the Carré Marigny, and two wings at right-angles to the quay, and flanking the Jardin de Paris. After the Exhibition these two wings will be devoted to the purposes of a museum of contemporary art, and a museum of modern sculpture. The main block will serve the same purposes as the present Palais de l'Industrie. At the last sitting of the Académie des Beaux-Arts, the Duc prize was conferred on M. Jossot for his museum at Nantes.

It is announced that the Berliet scheme for a tubular railway to unite the Bois de Boulogne with the Bois de Vincennes will shortly be submitted to Parliament. The "Société Nationale des Architectes Sanitaires" has been started in Paris under the presidency of M. Tollet, for the practical study of sanitary questions. M. Bechman, engineer-in-chief for the Sanitation of the Seine, is the vice-president. A fine steel bridge has been constructed on the Paris, Lyons, and Mediterranean Railway, on the line from St. Etienne to Montbrison, under the superintendence of M. Clair, engineer to the Company. The Municipality of Avignon have decided on the construction of Halles Centrales to replace the picturesque open-air market which has from time immemorial been held in the square and in the adjoining streets. The project will require an expenditure of three million francs. The "Société Nationale des Beaux-Arts" ("Champ de Mars Salon") will be represented at the Berlin Art Exhibition by about one hundred and fifty works in painting, sculpture, and objects of artistic design. The death is announced, at the age of forty, of the sculptor Jean Rouilleux. He was born at Liborne, and commenced life as a stone-mason; he became subsequently the pupil of M. Cavelier and M. Lafon, and devoted himself entirely to sculpture. He exhibited busts and medals since 1878, and for his first important works, the statue of Lazare Carnot (now erected at Noyat) and the figure of Hebe, he received a second medal in the Salon of 1882. At the exhibition of 1889 he received a silver medal and the Cross of the Legion of Honour. He since produced a bust of Louis de France, and a statue of Jean de Chanson, and which figured in the Salon of 1892, and the monument (which he left nearly completed) of the late President Carnot, intended for the town of Noyat.

PATENT LAW IN PORTUGAL.—We are informed that a new patent law has been published in

Portugal which will be more favourable to the development of inventions and industrial enterprise in that country than the existing law. Details are not to hand at present, but it is stated that, among other changes, the fees to be paid by foreign inventors for securing their rights in Portugal have been much reduced.

MISCELLANEOUS.

CIVIL AND MECHANICAL ENGINEERS' SOCIETY.—The members of this society on Saturday last visited the works for the Great Wheel now in course of erection at West Kensington. Of this we have already given a description on the occasion of the visit of another engineering society. The members then visited the site of the forthcoming Indian Exhibition by permission of Mr. Collard, the architect, and were shown the French Hippodrome, a large roof now in course of construction by Messrs. Handyside, and a newly-built mosque for the use of the Mahomedan attendants at the Exhibition. **THE INCORPORATED ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.**—The nineteenth voluntary pass examination of candidates for municipal surveyorships, carried out by this Association, took place (by kind permission) at the Institution of Civil Engineers, Great George-street, Westminster, on Friday and Saturday, the 5th and 6th inst. There were twenty-five entrants for this examination, and nineteen candidates presented themselves for the test. The examiners were (I.) Engineering as applied to Municipal Work—Mr. A. M. Fowler, M.Inst.C.E. (President); (II.) Building Construction—Mr. W. Geo. Laws, M.Inst.C.E. (Past President); (III.) Sanitary Science—Mr. Chas. Jones, M.Inst.C.E. (Past President); (IV.) Public Health Law &c.—Mr. J. T. Eavys, M.Inst.C.E. (Past President), the superintending examiner. The next examination will be held in Manchester on October 4 and 5.

THE PLASTERERS' STRIKE, ABERDEEN.—The beginning of the end of this strike came on the 9th inst. The strike commenced on the 23rd ult. On Tuesday last, of the 140 who went out, only eighteen remained on the strike-roll, the rest having obtained employment in other towns, or with the two outside employers in Aberdeen, who conceded the advance of 1d. per hour. On Monday two members of the Masters' Association also granted the rise. Great dissatisfaction has been felt at houses and shops that should have been finished by Whit Sunday term next month having been left alone, although the proprietors were willing to pay for the increase of the wages sought. Other branches of the building trade have also been greatly hindered.

APPOINTMENT OF DISTRICT HIGHWAY SURVEYORS.—On the 8th inst., the West Elloe (Spalding) Rural District Council made the following appointments of surveyors of highways for the several districts of West Elloe, Spalding—Weston District, Mr. T. Drum Spalding; Finchbeck District, Mr. W. T. Smith; Pinchbeck; Gosberton District, Mr. R. Doubleday, Gosberton; and Donington District, Mr. T. Cawdon, Donington.

APPOINTMENT OF SURVEYORS, NEWTON ABBOT.—At Newton Abbot Rural District Council, on the 3rd inst., nine candidates applied for the two posts of road surveyors. For the first Mr. J. L. Davey, Tavistock, was elected, while Mr. W. W. Warne was elected for the second. Mr. Davey takes the northern division, with headquarters at Bovey; Mr. Warne the southern, with headquarters at Newton.

MEETINGS.

SATURDAY, APRIL 13.

Edinburgh Architectural Association.—Visit to (1) Heriot Hospital Technical School; (2) The Royal Hospital for Sick Children.

WEDNESDAY, APRIL 12.

Builders' Foremen and Clerks of Works Institution.—Quarterly Meeting of the Members. 8 p.m.
Carlisle Architectural, Engineering, and Surveying Association.—8 p.m.
British Architectural Association.—The Rev. Henry Carr, M.A., on "A Recent Visit to Carthage." 8 p.m.

THURSDAY, APRIL 12.

Society for the Encouragement of the Fine Arts.—Second Conversazione, at the Galleries of the Royal Institute of Painters in Water Colours, Piccadilly.

FRIDAY, APRIL 13.

Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—Mr. W. C. Tyndall on "House Drainage." 8 p.m.

SATURDAY, APRIL 20.

Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—Inspection and Demonstration of Banking Sewage Outfall Works.
Glasgow Architectural Association.—Visit to Stirling.
Queen's College, Cork.—Mr. Arthur Hill on "The History of Architecture." XIX. 3 p.m.

RECENT PATENTS:

ABSTRACTS OF SPECIFICATIONS.

4,271.—**WINDOWS.** A. W. Wills.—According to this invention the window-frame is constructed so as to provide a means of ventilation. The top of the frame and the sides are formed hollow, the lower hollow part of the frame communicating through a short passage with the outer air whilst the top part of the frame communicates by means of a long slit with the interior of the room. A curved hinged bar is used for opening or closing the slit.

6,510.—**WINDOWS.** B. Wills.—This patent relates to

methods of raising, lowering, and balancing windows, and is effected by means of jointed rods arranged after the manner of a pantograph. Two of the adjacent sides of this parallelogram are extended to a convenient distance and act as a kind of lever, the fulcrum of which is the top of the pantograph, projecting between them and attached to a fixed pin. By means of flat weights attached to an arm of each pantograph, the window may easily be raised or lowered.

5,890.—**PAVING.** G. Cory and another.—The object of this invention is to provide a non-slipping material for road and street paving, consisting of a composition of asphalt or cement, together with a quantity of waste fibrous materials, such as wood shavings, chips, bark, or fibrous materials.

7,620.—**PAINTING.** J. Redman.—This invention relates to methods of applying paint by means of a hose attached to a cylindrical-shaped vessel provided with an air-pump, by which air can be forced into its interior. The air suction is connected to a coil of pipe below the bottom of the vessel, so that when the vessel is placed over a fire the paint may be applied hot.

8,843.—**SASH FASTENER.** W. Nicol.—To prevent sliding windows being opened from the outside, a crank-shaped swivelling arm, having a deep flange projecting at right angles at its loose end, is mounted by a pin on the face of the lower sash-frame. A double-kneed plate is screwed into a recess in the battened rod opposite the arm, and acting in conjunction with it, prevents either sash being opened.

9,045.—**WATER-CLOSETS.** H. Dakin.—Refers to the joint between the closet and the outlet pipe. The closet-trap outlet is provided with an annular groove into which a spigot-end of the outlet bend is inserted. This is fixed by pouring in cement.

20,995.—**TILES.** T. Jarrett.—To securely fix tiles to floors, walls, &c., under surfaces are formed in them by placing in the moulds a flexible air-containing apparatus which, by pressing, produces the surfaces required.

1,247.—**LADDERS.** A. Bartlett.—A device to be attached to ladders for holding articles, &c. A plate or tray is fixed to rods having hooks to catch on the rung of the ladder. Other hooks fixed to collars slide on the rods and act as stays.

NEW APPLICATIONS FOR LETTERS PATENT.

MARCH 25.—6,109, S. and M. Adams, Flushing Syphons.
—6,110, W. Given, Joint for Pipes.—6,131, W. Mappin, Spindles and Knobs for Door and other Handles.—6,134, W. Sykes, Yard Gullies.—6,136, W. Sykes, Street Gullies.—6,174, J. Edwards and the Coalbrookdale Company, Limited, Devices for supporting, adjusting, and holding in position Eave Brackets, Scaffolds, and other similar articles.—6,179, H. Mossner, Construction of Floors and Ceilings.

MARCH 26.—6,227, F. Brooke, Slow Combustion Fireplaces.—6,229, W. Stanley, Surveyors' Levels.—6,237, E. Böhm, Enamelled or Glazed Bricks and Tiles.—6,239, R. Hughes and J. Gill, Machinery for Pressing Bricks, &c.—6,240, G. and J. Rushworth, Securing Saw Blades for Stone-sawing Machinery.—6,255, J. Lemming, Pipes or Channels for Drains and Sewers, and in the jointing of same.

MARCH 27.—6,309, J. Glaister, Draught Excluder for Doors.—6,319, R. Folland and R. Gibbs, Grindstones.—6,341, M. Rutley, jun., Kegs, Cans, or Receptacles for storing Paint, &c.—6,343, S. Whitehead, Sash-Fastener.

MARCH 28.—6,416, P. Ball and J. Winter, Ceiling Roses for Electric Light Fittings.

MARCH 29.—6,437, W. Scott-Moncrieff and H. Farmer, Flushing Apparatus.—6,461, J. Graep, Protective Lattice Windows.—6,463, K. Krebs, Stoves.—6,485, P. McKenney, Frames and Casings for Window Shades and Blinds.—6,499, W. Tickle, Saws.—6,501, M. Schroeder, Water Pipes.

MARCH 30.—6,539, J. Green, Weather Bars or Draught Excluders for Doors, &c.—6,590, E. Glasikin, Gate and other Locks.—6,614, R. Adams, Opening, Closing, Regulating, and Fastening at any desired angle Swing and other Windows, Ventilators, Doors, &c.

PROVISIONAL SPECIFICATIONS ACCEPTED.

4,067, W. Fox, Disinfectant Ventilator, Dirt and Dust, Soil, and Smuts Excluder, to be attached to Window sashes and Frames.—4,306, W. Ederington, Prevention of Bursting of Kitchen Boilers.—4,772, J. Hamilton, Water-closets.—4,825, G. Harlehurst, Thawing Frozen Water-pipes.—4,839, J. Jones, Kitchens.—4,936, J. Bruce, Self-closing Gates and Doors.—5,465, W. Marshall, Window-casements and Frames.

COMPLETE SPECIFICATIONS ACCEPTED.

(Open to Opposition for Two Months.)

6,168, W. Horne, Fireproof Buildings, and rendering Existing Buildings Fireproof.—9,352, H. Chubb, Waste Preventing and Flushing Cisterns for Water-closets, &c.—9,415, F. Lynde, Clearing Drains, and other Pipes.—24,855, M. Adams, Flushing Apparatus, &c.—4,009, J. Wilson, Smoke Cures and Ventilators.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

APRIL 2.—By J. D. Wood & Co.: No. 38, Gray's Inn-rd., 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

APRIL 3.—By Furber, Price, & Furber: 77, Hackney-rd., Hackney, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 3

CONTRACTS—Continued.

PUBLIC APPOINTMENTS.

Those marked with an asterisk (*) are advertised in this Number. *Contracts*, pp. iv., vi., vii., viii., and xvii. *Public Appointments*, p. xvi.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 3 p.m. on Thursdays.*]

<p>ABERDEEN.—Accepted for the erection of a shop, New Deer, for Messrs. James Mackie & Co., Ltd. Mr. Jas. Duncan, architect, Turfrie:—</p> <p><i>Masonry.</i>—Muir & Critchton, New Deer £ 270 10</p> <p><i>Carpenry.</i>—A. Munro, New Deer 210</p>	<p><i>Painting.</i>—Carter & Sons 42 0 0</p> <p><i>Painting.</i>—Archer Wilson 24 18 0</p> <p><i>Plastering.</i>—John W. Douthwaite 70 9 0</p> <p><i>Smoking and Fumigating.</i>—Architect's estimate 135 0 0</p>
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[All of Accrington.]

BIRMINGHAM.—For making, &c., seven new roads Grant
1, state two miles King's Heath, for the Birmingham Freehold

BATH.—For the erection of school buildings, Bathampton, for the Bathampton School Board. Mr. W. J. Wilcox, architect, 1, Belmont.		Land Society. Mr. Thos. S. Fallows, Surveyor, 59, Temple-row, Birmingham.	
Baths. Quantities by architect:—		Hall	£10,300 0 0
W. Webb	2,200 0	Jacob Biggs	9,250 0 0
B. Smith	2,705 0	Geo. Lang	9,000 0 0
H. Bradbury	2,100 0	John White	8,975 18 9
			McKay
			Jones & Pritchard
			Curral & Lewis
			Birmingham?

BERKSHIRE COUNTY COUNCIL.—For the Berkshire County
Bridges.—
Masonry, Brickwork and Stoning, — W. G. Burt, — £549
Plastering, — Charles Hoare & Sons, —
Contract No. 1.—Brick Bridge at Aldermaston
(All of Bradford)

Tucker	£ 260	0	James	£ 164	0	
Allen	215	12	0	Johnson, Woolhampton		
Carter	1			ton	151	15
[Surveyor's estimate, £ . . .]						
BROTHERTON (Yorks.).—For the erection of school building and master's house, for the School Board. Mr. John Holme Greaves, architect, Leeds and Pontefract. Quantities by the architect:—						
Bridge, Frampton.—Steelwork.						

Allen	42	0	Excavating, Bricklaying, and Masonry —	
Elms	375	0	Geo. Spurr, Pontefract	£12:0 0 0
The Horsehay Co.,	369	14	Carpentry and Joinery .. Barker & Jowett,	
Newton, Chalmers, &			Pontefract	674 12 0
Co.	366	10	Plumbing.—Jas. Powell, S. Milford	150 0 0
Co.	366	10	Painting	45 0 0
Co.	366	10		

[illegible]

Contract No. 3.— <i>Abel Bridge, Brimpton—1 in. lat. 1 s.</i>		BUILT (Wales).—Accepted for the erection of an iron bridge over the River Wye, for the County Council (Breconshire). Messrs. Wm. Williams, County Surveyor, Shire Hall, Brecon:—	
Tucker	£545 0 0	Allen	£4 5 0
Caffin	452 11 11	Johnson	4 5 0
Elms	479 0 0	T. James, Midgham*	4 5 0
		Finch & Co., Bridge Works, Chepstow	£160

[Survey 1868, p. 2, 4, 210]

CONTRACT A 4-10-11-12-13-14-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29-30-31-32-33-34-35-36-37-38-39-40-41-42-43-44-45-46-47-48-49-50-51-52-53-54-55-56-57-58-59-60-61-62-63-64-65-66-67-68-69-70-71-72-73-74-75-76-77-78-79-80-81-82-83-84-85-86-87-88-89-90-91-92-93-94-95-96-97-98-99-100-101-102-103-104-105-106-107-108-109-110-111-112-113-114-115-116-117-118-119-120-121-122-123-124-125-126-127-128-129-130-131-132-133-134-135-136-137-138-139-140-141-142-143-144-145-146-147-148-149-150-151-152-153-154-155-156-157-158-159-160-161-162-163-164-165-166-167-168-169-170-171-172-173-174-175-176-177-178-179-180-181-182-183-184-185-186-187-188-189-190-191-192-193-194-195-196-197-198-199-200-201-202-203-204-205-206-207-208-209-210-211-212-213-214-215-216-217-218-219-220-221-222-223-224-225-226-227-228-229-230-231-232-233-234-235-236-237-238-239-240-241-242-243-244-245-246-247-248-249-250-251-252-253-254-255-256-257-258-259-260-261-262-263-264-265-266-267-268-269-270-271-272-273-274-275-276-277-278-279-280-281-282-283-284-285-286-287-288-289-290-291-292-293-294-295-296-297-298-299-300-301-302-303-304-305-306-307-308-309-310-311-312-313-314-315-316-317-318-319-320-321-322-323-324-325-326-327-328-329-330-331-332-333-334-335-336-337-338-339-340-341-342-343-344-345-346-347-348-349-350-351-352-353-354-355-356-357-358-359-360-361-362-363-364-365-366-367-368-369-370-371-372-373-374-375-376-377-378-379-380-381-382-383-384-385-386-387-388-389-390-391-392-393-394-395-396-397-398-399-400-401-402-403-404-405-406-407-408-409-410-411-412-413-414-415-416-417-418-419-420-421-422-423-424-425-426-427-428-429-430-431-432-433-434-435-436-437-438-439-440-441-442-443-444-445-446-447-448-449-450-451-452-453-454-455-456-457-458-459-460-461-462-463-464-465-466-467-468-469-470-471-472-473-474-475-476-477-478-479-480-481-482-483-484-485-486-487-488-489-490-491-492-493-494-495-496-497-498-499-500-501-502-503-504-505-506-507-508-509-510-511-512-513-514-515-516-517-518-519-520-521-522-523-524-525-526-527-528-529-530-531-532-533-534-535-536-537-538-539-540-541-542-543-544-545-546-547-548-549-550-551-552-553-554-555-556-557-558-559-560-561-562-563-564-565-566-567-568-569-570-571-572-573-574-575-576-577-578-579-580-581-582-583-584-585-586-587-588-589-590-591-592-593-594-595-596-597-598-599-600-601-602-603-604-605-606-607-608-609-610-611-612-613-614-615-616-617-618-619-620-621-622-623-624-625-626-627-628-629-630-631-632-633-634-635-636-637-638-639-640-641-642-643-644-645-646-647-648-649-650-651-652-653-654-655-656-657-658-659-660-661-662-663-664-665-666-667-668-669-670-671-672-673-674-675-676-677-678-679-680-681-682-683-684-685-686-687-688-689-690-691-692-693-694-695-696-697-698-699-700-701-702-703-704-705-706-707-708-709-710-711-712-713-714-715-716-717-718-719-720-721-722-723-724-725-726-727-728-729-730-731-732-733-734-735-736-737-738-739-740-741-742-743-744-745-746-747-748-749-750-751-752-753-754-755-756-757-758-759-760-761-762-763-764-765-766-767-768-769-770-771-772-773-774-775-776-777-778-779-780-781-782-783-784-785-786-787-788-789-790-791-792-793-794-795-796-797-798-799-800-801-802-803-804-805-806-807-808-809-810-811-812-813-814-815-816-817-818-819-820-821-822-823-824-825-826-827-828-829-830-831-832-833-834-835-836-837-838-839-840-841-842-843-844-845-846-847-848-849-850-851-852-853-854-855-856-857-858-859-860-861-862-863-864-865-866-867-868-869-870-871-872-873-874-875-876-877-878-879-880-881-882-883-884-885-886-887-888-889-890-891-892-893-894-895-896-897-898-899-900-901-902-903-904-905-906-907-908-909-910-911-912-913-914-915-916-917-918-919-920-921-922-923-924-925-926-927-928-929-930-931-932-933-934-935-936-937-938-939-940-941-942-943-944-945-946-947-948-949-950-951-952-953-954-955-956-957-958-959-960-961-962-963-964-965-966-967-968-969-970-971-972-973-974-975-976-977-978-979-980-981-982-983-984-985-986-987-988-989-990-991-992-993-994-995-996-997-998-999-1000-1001-1002-1003-1004-1005-1006-1007-1008-1009-1010-1011-1012-1013-1014-1015-1016-1017-1018-1019-1020-1021-1022-1023-1024-1025-1026-1027-1028-1029-1030-1031-1032-1033-1034-1035-1036-1037-103

Lubbery & Co.	17	F	11	Sing & Emmen	108	2	J
Pims	13-	0	11	Cottrell & Co.	105	2	J
Newton, Chambers, & Co.	251	10	0	Ews	101	12	0
The Horsey Co.	17	14	2	Bany & Higham	98	10	0
Engineering Supply				Hrettel	96	0	0
				Cave and Bridge &			

Eng. & Co.	125 15	7	Engineering Co.,	84 8 0	James Rich, of Cardiff,
Fitch & Co.	126 1	7	Darlington		
Tildesley & Co.	127 6	0	Hall & Smith	103 2 2	Alma street £125 5 3
Stowell & Co.	128 2	2	J. J. Robins	103 5 4	Alma street £125 5 3
Peacock & Co.	129 12	6	Ala. street		Eschich-street £141 12
[Surrey]			Ala. street		Dalross-street 312 10
			Ala. street		Donald-street ... £138 3 1
			Ala. street		Alma line 31 13
			Ala. street		Sin 1 0 13

Truckers	350	0	0	Woolridge & Son	204	7	0
Hoskins	250	0	0	Allen	195	0	0
Plans	0	0	0				

[Surveyor's estimate, £223 1 4]

(Contract No. 5—Bogshill Bridge Foundations.)

Woolridge & Son	204	7	0	Port Street	373	14
Ex. Labor street	143	10	0	Tril. line	214	13
Tr. & L. Street	135	7	4			

(CHEAM.—For alterations, &c., at the "Lord Nelson" Inn, Cheam, for the London & Burton Brewery Co., Messrs. Saunders & Co., Ltd., 10, Abchurch Lane, London, E.C. 4.)

	I.	II.	III.	IV.	Total.
Allen, Messrs. (L.)	£	£	£	£	£
Horsley Co. (L.)	152	10	0	0	162
Newton, Chambers & Co.	114	0	0	0	114
Co. (L.)	15	3	0	0	18
Cochrane & Co.	114	10	0	0	124
Ellis, Messrs.	122	3	0	0	125
Woodall, Messrs.	131	4	0	0	135
Cottle & Co.	114	0	0	0	114
Lydgat, Ltd.	114	10	0	0	124
Person & Co.	114	10	0	0	124
Ellis, Messrs.	122	3	0	0	125
Woodall, Messrs.	131	4	0	0	135
Cottle & Co.	114	0	0	0	114
Lydgat, Ltd.	114	10	0	0	124
Person & Co.	114	10	0	0	124

Rucker	145	c	Harry & Higham	110	0	Balchin & Toptland	312	114	34	37	267
Turnley & Co.,	138	1	Brettell	16	0	[I.—New shop front; II.—New tap-room, &c.; III.—Blacksmith					
Tudley	135	c	Cleveland Bridge Co.,			shop repairs, IV.—Fittings]					
Finch & Co.,	114	11	Ltd	64	0						
Shewell & Co.,	131										
Pitts	130	12	J. J. Keates,	£11	0						

CRAMLINGFON (Northumberland).—For the erection of

Dyne, Steel, & Son .. 171	5	0	11	1	1	3	bakery, &c., for the Co-operative Society. Mr. J. G. Cronc
[Surveyor - 1st Ave. 2144 - 11]							architect, 5, Grainger-street, Newcastle-on-Tyne ..
Barrett & Co.	£	798	0	0	0	0	£734 1
A. G. G. Jones ..	£	743	13	0	0	0	£743 13
Tucker ..	£	400	0	0	0	0	£400 0
Wheeler ..	£	275	0	0	0	0	£275 0
Accepted.							
[The value of goods and materials which are the subject of the							

[Supplies estimate, 1915-16, 2d.] by Mason & Co., Limited, Manchester]



TIMBER.	TIMBER (continued).
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[illegible]

... ton 10 10/0 10/17 (

.....	25/10/0	0/0/0
.....	23/5/0	0/0/0
.....	23/10/0	0/0/0
English		
.....	22 10 0	0 0/0
.....	21/0/0	0/0/0
Ref. ..	17/15, 0	18/15/0
.....	19/10/0	21 10/0
U.S.	4/0/0	5/0/0
.....	5/0/0	12/0/0
Shoim		
Barrel	1 1/0	1 1/0
.....	0/15/0	0/0/0

WARRINGTON.—For forming and paving Hanover-street and others, for the Council. Mr. Thomas Longdon, Borough Surveyor, Town Hall, Warrington.

Thos. Stringer	£270 0 0
Thos. Stringer	£270 0 0
F. T. Bennie	£240 0 0
Win. Heaton	£1 3 4

[All of Warrington.]

WELLINGBOROUGH.—For the erection of a retaining wall, Del. date, Hardwick road, for the Urban District Council. Mr. Edward Sharman, Surveyor, Market-square, Wellingborough. Quantities by Mr. C. Archer.

G. A. Smith	£120 0
R. Sidelbottom	218 0
R. Marriott	125 0
Hackley Bros.	240 0

WEST HAM.—For erecting St. Matthew's Church and Parochial Hall, St. Matthew's Park, West Ham, for the Rev. R. Arnold Pelly, Mr. E. P. Lotus Brock, F.S.A., architect.

Mattcock Bros.	£4,375
A. Reed & Son	4,375
J. Allen & Sons	4,375
R. G. Minter	4,000
W. Watson	4,000
S. J. Scott	3,917
J. Smith & Son	3,800
J. C. Farmer	3,814
Chas. North (withdrawn) ..	3,550

WEST HOATHLEY (Sussex).—Accepted for repairs and additions to house, Bark Grove, Mr. R. Mawhood, architect.

W. Baker, Danbury, Essex ..	£297 10
-----------------------------	---------

YEovil.—For supplying and laying 2,000 yards stoneware pipe sewer, for the Rural District Council. Mr. Thomas Farrall, engineer, Sherborne, Dorset.

W. Guyatt, Zeals, Mers. Wilts.	£738
-------------------------------------	------

Several others tendered

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Williams, 16, Craven-st., Strand, W.C. [AD

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ILLUSTRATIONS.

The Fugger Chapel, St. Anne's, Augsburg.—Drawn by Mr. H. W. BrewerDouble-Page Photo-Litho.
Christ Church, Cheltenham: Interior Remodelled.—Messrs. Middleton, Prothero, & Phillott, Architects	.....Double-Page Photo-Litho.
Design for a Church near Preston, Lancashire.—Messrs. Clark & Hutchinson, Architects	.....Single-Page Photo-Litho.
New Stalls and Decoration to Church, Pye-street, Westminster.—Mr. John Belcher, F.R.I.B.A., Architect	.....Single-Page Photo-Litho.
New House, Sharneden, near Mayfield, Sussex.—Mr. H. O. Cresswell, A.R.I.B.A., Architect	.....Two Single-Page Photo-Litho.

Blocks in Text.

Diagrams illustrating article on Bath Stone	.....Pages 291, 293, 295	Plan, Design for Church near Preston	.....Page 299
Embossed Frieze: Designed by Mr. Stephen Webb	.....Page 297	Plan of House, Sharneden	.....Page 370
The Reredos, Schnekia Chapel, AugsburgPage 298	The "Paradigm" Skylight BarPage 373

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Notes	295	Decoration for a Church, Pye-street, Westminster	300	Sanitary and Engineering News	302
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Bath Stone.—II.

ANALYSIS OF THICKNESS OF BEDS.

CONSIDERABLE doubt has hitherto prevailed as to the capabilities of the different Bath stone quarries of producing blocks of large size, and it has been more than once hinted that, when the better quality of stone falls short in that respect, inferior kinds are substituted. This we shall prove, by the following analysis, to be utterly without foundation. The thickness of each bed was measured as it stood in the quarry, so that allowances have to be made for shaping and getting the blocks ready for market. This, in general, would mean a reduction in thickness of from 3 in. to 4 in. from each bed. It must, of course, be remembered that the depth of beds, except in such areas as that at Westwood and Limpley Stoke, varies as the stone is dug into. All the same, it is believed that we have made a sufficient number of measurements in each area to warrant us in arriving at definite results in regard to the present and ultimate capabilities of each area: In this connexion it may be remarked that the 403 measurements shown as actually having been made do not represent all that were taken, as, where two headings, close together, were inspected and were obviously alike, we made one measurement do for both. In the table (Table No. 1) on the next page the numbers in the columns refer to the number of beds in the quarry; thus, in Quarry No. 1, there are six beds below 1 ft. in thickness, one bed between 1 ft. and 1 ft. 6 in. in thickness, and one bed between 2 ft. 6 in. and 3 ft. in thickness.

From the foregoing summary it will be observed that for beds of great thickness, between 6 ft. and 8 ft., the only areas available are Westwood and Limpley Stoke, and there is plenty of stone in both. This thickness is, of course, much in excess of ordinary requirements. It is noteworthy that in the Box area the majority of the beds are of medium thickness, from 2 ft. to 4 ft. In the Corsham area a large proportion are under 2 ft., the general range being from 1 ft. 6 in. to 2 ft. 6 in.; at the same time, beds over 4 ft.

occur; and practically the same may be said of the Monk's Park area, though the extreme irregularity of the beds in certain of the quarries in the latter renders the average size of blocks a matter of uncertainty at times. A large number of the beds at

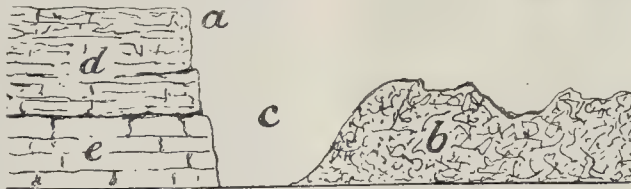


FIG. 11.—Section of Quarry on Coombe Down (No. 6), showing method of working.
a—Present face of quarry. b—Rubbish heaps derived from waste of former workings, and thrown behind as the face was quarried into. c—Space left between a and b to admit the passage of vehicles for carting away the stone as quarried. d—Overburden. e—Building stone to be quarried.

Farleigh are under 2 ft., but here, again, we see an occasional thickness sufficient for all practical purposes. The stone runs very thin in the surface quarries of the Bath area, whilst the absence of beds of less than 3 ft. in thickness is conspicuous in the Westwood and Limpley Stoke areas. Taking these last two facts together it would seem that where the Bath stone has a tendency to run in thick beds these are not accompanied by a corresponding series of thin ones; in other words, we do not find really thick beds in the same quarries as the thin ones, or even in the same areas. If now we compare the summary with the map (fig. 1), we observe that the thickest beds are to the south in the areas B, E, C; whilst there is, roughly speaking, a progression in thickness from the area A to the north-east, through the areas F and H. It is remarkable that on a broad scale there is an apparent connexion between structure and thickness of beds of Bath stone, and we regret that we cannot enlarge on this at the moment. A general impression exists in the district that the thickness of beds increases with depth of working, but although we are prepared to concede that this is the case with some other districts, it does not appear to hold good for the area under consideration, as will be seen on reference to our figures. Of course, if we consider the open quarries only, there is the normal passage from soil, through rubble stone and odd and thin-coursed material, down into the more solid building stone beds; whilst these latter on cropping

out at the surface are much more broken up than when found beneath a thickness of overburden.

Method of Quarrying.

Dealing first with the method of quarrying in the open works, the following diagram

(fig. 11), suffices to indicate the general plan adopted. As the overburden is removed, it is thrown behind the workers, at a sufficient distance from the face of stone to permit of the easy passage of horses and carts for carrying away the blocks as quarried.

In regard to the actual "getting," it may be premised that the rubble and hard useless stone constituting overburden are blasted with rock powder; the building stone is never raised in this way, inasmuch as apart from the waste attending the shaping of blocks due to the irregularity of the cracks produced, blasting has a tendency to "shatter" the stone, creating minute hair-line cracks. At the same time, a "tight place" in the open is occasionally relieved by "shot-hole" blasting. The ordinary method of quarrying the building stone beds is illustrated in the following reproduction from a photograph (fig. 12). We notice that after the removal of the closely-bedded stone and rubble forming the overburden, advantage has been taken of a wide joint in getting out the building blocks. The material is sawn *in situ* by means of a one-handed saw, down to the bedding-plane on which the man is standing. After this cut, another is made in the same manner at right-angles thereto, and the block is then lifted from its bed with the aid of iron bars. Subsequently, any rough surfaces on the stone are shaped by means of a two-edged stone axe, such as is seen in the illustration (fig. 12) resting on the unquarried mass of stone to the right of the sawyer. It may be remarked that but few building stones are capable of being

TABLE No. 1.—Thickness of Bath Stone Beds.

Quarry, or Point.	ft.in.	ft.in.	ft.in.	ft.in.	ft.in.	ft.in.	ft.in.	ft.in.	ft.in.	ft.in.	ft.in.	ft.in.	ft.in.	ft.in.	ft.in.
	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
No. 1	6	1	1	1	1	1	1	1	1	1	1	1	1	1	1
" 3	6	1	1	1	1	1	1	1	1	1	1	1	1	1	1
" 4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
" 7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
" 8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
" 9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
" 10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
" 11	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Fath area ..	29	10	9	7	7	2	2	3	...	...	...	...	...	...	...
No. 12	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 14	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 15	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 16	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Limpley Stoke area ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
No. 17 .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 18 .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 19 .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Winsley area .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
No. 21 .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 24 .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 24b .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 24c .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Westwood area .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
No. 25 .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 26a	2	1	2	1	2	1	2	1	...	...	...	...	...	...	...
" 26b	4	2	2	2	1	...	...	...	...	...	...	...	...	...	...
" 27a .....	...	2	1	1	1	2	1	...	...	...	...	...	...	...	...
" 27b	1	1	2	1	4	1	1	1	...	...	...	...	...	...	...
" 27c	1	1	2	1	1	1	1	1	...	...	...	...	...	...	...
" 27d	3	1	2	1	...	...	...	...	...	...	...	...	...	...	...
" 27e	1	1	2	1	...	...	...	...	...	...	...	...	...	...	...
" 27f	3	1	2	1	...	...	...	...	...	...	...	...	...	...	...
" 27g	1	1	2	1	...	...	...	...	...	...	...	...	...	...	...
Farleigh area	15	10	6	...	11	3	4	1	3	...	...	...	...	...	...
No. 30 .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 30a	1	1	1	1	1	1	1	1	...	...	...	...	...	...	...
" 30b .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 30c .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 30d .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 30e .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 30f .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 30g .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 30h .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 30i .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 30j .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 30k .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 30l .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 30m .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 30n .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 30o .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 30p .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 30q .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 30r .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 30s .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 30t .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 30u .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 30v .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 30w .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 30x .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 30y .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 30z .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Box area ..	2	6	8	5	15	1	2	1	...	...	...	...	...	...	...
No. 35 .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 35a .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 35b .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 35c .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 35d .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 35e .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 35f .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 35g .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 35h .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 35i .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 35j .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 35k .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 35l .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 35m .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 35n .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 35o .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 35p .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 35q .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 35r .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 35s .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 35t .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 35u .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 35v .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 35w .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 35x .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 35y .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 35z .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Corsham area ..	5	14	6	12	7	5	1	1	...	...	...	...	...	...	...
No. 43a .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 43b .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 43c .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 43d .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 43e .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 43f .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 43g .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 43h .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 43i .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 43j .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 43k .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 43l .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 43m .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 43n .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 43o .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 43p .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 43q .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 43r .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 43s .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 43t .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 43u .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 43v .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 43w .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 43x .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 43y .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" 43z .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Mink's Park area ..	7	17	...	15	12	5	7	...	...	...	...	...	...	...	...

quarried in such an easy manner as this, whereby at least two even surfaces are produced on the block, so that work and waste are reduced to a minimum. An obsolete method of "getting" the stone is well exemplified in the old workings at Murhill (Quarry No. 17), near Winsley, and elsewhere in the district, where, before the introduction of the one-handed saw, picks were employed; the marks of these latter, producing a peculiar effect, are quite clear to the present day.

Turning now to the method of quarrying Bath stone underground, which is a very different affair, we may first allude to the opening up of the mine. The stone mines in the district have been opened on three different plans, (1) horizontally, running into the side of a hill; (2) tunnels constructed at a high inclination; and (3) vertical shafts. Those of the first-mentioned type—tunnels driven into a hill by following up and excavating in the building-stone bed, are limited in numbers, and may be sufficiently understood without further description. The second type is that most commonly adopted

in the district under consideration, and refers to nearly all the mines in areas B, F, and I, the majority in G, and H, and to one each in A, and E*; in short, to nearly all the principal quarries. It will be easily understood, on reference to figs. 13 and 14, as also, will the means of drawing stone out of the mine by means of obtaining the stone by means of a vertical shaft—requires no explanation. Quarry No. 35 furnishes the best example of it in the district. The haulage above ground is by steam-power or by horses and winch.

As will have been surmised from the legend attached to fig. 14, the stone is transferred from the various headings to the bottom of the inclined shaft in trucks running on tram-rails. In the majority of the workings the haulage underground is effected by means of horses, but in the case of the Clift Quarry (No. 30), in the Box area, and some other workings connected therewith, the stone is drawn out on the flat by means of a steam-engine. That from Corsham Down Quarry (No. 37) is placed in railway trucks underground, communicating directly with the Great Western Railway system. In a few of the smaller quarries, or where no tram lines are laid down, the stone is drawn out on the flat in wagons, by horse-teams.

In regard to the actual method of "getting" underground, we would direct attention to fig. 15. The first operation in driving the heading is to remove two or three inches of the stone immediately under the roof, by means of picks; the part thus to be removed is called the "jad," or "picking jad" (d). By creating this space the quarrymen are enabled to insert tools to loosen the blocks below, but in order to do this more effectually a third bed (c), known as the "picking bed," is also taken out, both this and the jad being reached from a ledge called the "picking standing" (d), whereon the picker stands. Plenty of room having now been obtained, the one-handed saw is called into requisition, and with this, and subsequently iron bars, the blocks are removed. A hand-crane is used at every heading to assist in the work. Under certain circumstances a "lewis" is inserted into the face of the block, and this being attached to the crane, either directly or indirectly, is utilised for dislodging the blocks from position. At point b in the Clift quarry (No. 30) the "jad" was being picked from scaffolding. In sawing underground, water is always used, not so much that it makes the stone softer along the line of cutting, but because it washes out the dirt made during the operation, and thus frees the cut of obstruction. The roofs of the workings vary considerably, some being very sound, others permeated by innumerable cracks. The general method of



FIG. 12. "Getting" Bath Stone, at Mount Pleasant Quarry, Coombe Down.

regarded with much favour, seeing that they disturb the general regularity of the beds, and often lead to a considerable amount of unremunerative work. Fig. 16 shows how step-faults are dealt with.

Quarrying is also occasionally impeded by wide joints containing ferruginous clay ("barrs") which discolours stone in the vicinity, and in former geological times allowed the free percolation of water, with consequent regional decomposition.

Seasoning.

We have very little to say in regard to this. At many quarries the stone was either being converted on the spot immediately after it was extracted, or was being despatched to various "jobs." In such cases seasoning was, of course, not possible. In saying this we convey no imputation against the quarry owners, inasmuch as many architects and builders prefer not to have the stone seasoned. That process hardens the material, and in consequence increases the cost of labour, and there being a demand for the unseasoned stone, it is, naturally, supplied. At the same time, we could not help feeling that amongst certain of the smaller quarry-owners no serious attempt was being made to "weather" or season the stone, even where it might have been desired. The case was different with larger firms, at whose quarries immense stacks of stone were often found. When stacked above ground to "weather" in winter time much of the material is liable to deteriorate, so that the stone quarried in mines during that season of the year is either stored in the spacious galleries underground, or sent off at once to the building. Having

said this, we leave our readers to imagine what may happen to some of it when drawn from the quarry during winter and used at once for exteriors. The material stored underground is taken above during the early spring, is then stacked, and being exposed to the air is allowed to season in summer-time, after which it is not so liable to decay. A great deal has been made in the past of the improvement effected in "weathering" such stones as that from Bath before using

them. We do not desire to make any further comment than to remind those who attach such great importance to this, that no amount of seasoning can render a really bad block of stone good. From the manner in which some people allude to the beneficial effects of seasoning one would be led to imagine that any rotten, worthless kind of stone is converted into a good one by being simply placed out in the wind for a season. The stone must be good in the first instance, and it will then most probably be improved by being allowed to "weather," but that depends entirely on the particular kind of stone. We cannot now discuss the desirability, or otherwise, of always building Bath stone "on its natural bed," but we may remark in this connexion that in order to facilitate masons in ascertaining the direction of the bedding-planes, much of the material is marked before leaving the quarries.

Carriage of Stone.

Bath stone is taken from the quarries either by horse-teams, traction-engines, railway direct, or a system of inclined planes. We may only refer to the last-mentioned, which is adopted principally in area I, and in the western part of G. The following diagram (fig. 17) shows that between the Park Lane Quarry and Corsham Station a low ridge intervenes. Instead, therefore, of starting the loaded trucks down an incline direct to the station, as is done from the Clift Quarry to Box, an engine (*b*) is stationed at the summit of the ridge which pulls the trucks (*a*) from the entrance of the quarry to the top of the hill. Then (each truck being in charge of a breaksman) they are permitted to accomplish the remainder of the journey to Corsham Station by gravitation, with a little occasional assistance from a horse. The quarries in the southern part of the Bath district are fed partly by a canal, whilst railways, as will be seen on referring to fig. 1, run through the whole system.

Micro-Structure.

This has been fully described and illustrated in our columns on a former occasion,* and the reader is requested to consider what we then said with reference to what follows.

Chemical Composition.

We have not thought it worth while to make independent chemical analyses of Bath stone, seeing that its properties in this respect are not important as throwing any light on the quality of the material, and may be sufficiently gleaned from what we have already said concerning its micro-structure. At the same time, as a matter

* The Builder, January-June, 1894, pp. 354, 372.

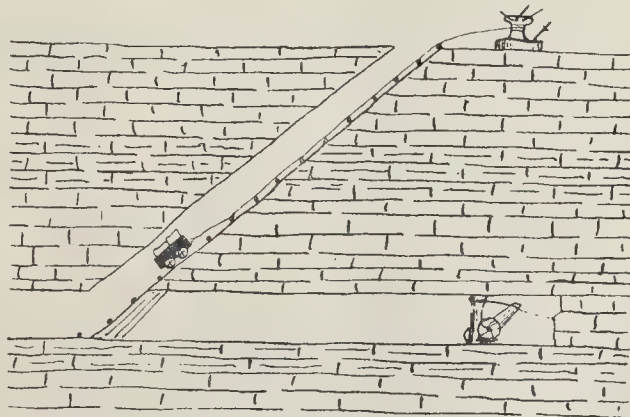


FIG. 13.—Section showing Inclined Shaft and method of hauling stone from a mine.

d

of general interest, we may quote the following:—

Coombe Down stone.*			
Water	1	11	
Silica	33	74	
Protoxide of iron	1	14	
Alumina	46	74	
Carbonate of lime	95.74	95.74	
Carbonate of soda	1	71	
Magnesia	12	71	
Chloride of sodium	05	70	
	97.1	97.77	

Monk's Park Box Ground stone †			
Carbonate of lime	67.2	94.13	
Oxide of iron and alumina	1.0	1.20	
Silica	1.0	—	
Carbonate of magnesia	2	2.51	
Water and loss	—	1.20	
Burnt	—	trace	

* Ransome and Cooper, "Mem. Geol. Surv. Gt. Brit.," Vol. II, Pt. 2 (1848), p. 697.

† Analyses made by Professor Atfield.

‡ Daniell and Wheatstone, "Commissioners' Report" (1835), p. 30.

Strength.

We give the following particulars (Table No. 2) concerning the strength of the different varieties of Bath stone, in order that their general resistance to crushing may be understood.

TABLE No. 2.—Strength of Bath Stone.

Name of Stone.	Size of cubic.	Cracked.		Crushed.		Test made by
		Tons per sq. foot.		Tons per sq. foot.		
		Minimum.	Maximum.	Minimum.	Maximum.	
Corsham Down ("fine upper" bed)	10.					Kirkaldy.
" " (bottom bed)	12	64.4	—	81.7	—	"
" "						

TABLE No. 3.—Experiments on some Physical Properties of Bath Stone.

Name of Area.	No. of points.	Specific Gravity.	Weight per cubic foot in lbs.		Absorption of Water—per cent.						Remarks.
			True.	Particles Dry.	Wet.	1 sec.	1 min.	30 min.	1 day.	1 week.	
Bath	1	2.54	127.3	148.5	1.45	1.11	3.75	1.42		Odd Down.	
	2	1.72	2.55	126.8	150.7	2.33	0.43	1.11	12.16	Coombe Down.	
	7	2.10	0.61	131.0	160.9	1.60	4.10	7.76	8.25	"	
	8	1.77	2.49	130.4	155.4	2.61	7.00	10.47	13.17	"	
	10	2.10	2.41	131.0	151.6	7.3	9.44	5.82	5.80	Third bed from top.	
	11	1.92	2.40	138.5	149.8	2.00	5.00	8.50	0.00	"	
	12	1.45	2.68	121.7	161.0	2.31	0.18	10.10	11.08	"	
	13	1.59	2.57	117.9	160.4	1.06	2.15	12.24	13.75	"	
	14	1.10	2.60	131.0	162.2	1.35	4.05	8.17	8.14	"	
	15	1.61	2.64	122.3	165.4	2.48	7.20	11.52	11.00	"	
Windsley	16	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
	23	2.09	2.64	130.4	164.7	1.12	4.47	8.70	9.70	"	
	24	2.07	2.39	130.2	161.1	1.26	2.15	6.50	6.02	Paving Bed.	
	25	2.12	2.61	126.0	164.1	1.06	2.55	10.12	10.45	"	
	26	2.06	2.59	127.5	161.6	1.60	4.00	8.11	9.11	"	
	27	2.04	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
	28	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
	29	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
	30	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
	31	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
Farleigh Down, Kingsdown.	32	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
	33	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
	34	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
	35	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
	36	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
	37	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
	38	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
	39	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
	40	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
	41	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
Lye.	42	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
	43	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
	44	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
	45	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
	46	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
	47	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
	48	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
	49	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
	50	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
	51	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
Coombe.	52	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
	53	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
	54	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
	55	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
	56	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
	57	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
	58	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
	59	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
	60	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
	61	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
Monk's Park.	62	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
	63	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
	64	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
	65	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
	66	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
	67	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
	68	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
	69	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
	70	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	
	71	2.01	2.57	127.3	160.4	1.01	4.17	0.38	9.74	"	

Conclusion.

In concluding this somewhat lengthy article we may observe that the Bath stone as now used, is different to most of that worked at the commencement of the century or even seventy years ago. It was therefore with great reluctance that we brought ourselves to quote the chemical analyses of Coombe Down stone made in 1848, or those by Daniell and Wheatstone in 1839; we admitted them only after satisfying ourselves that the Coombe Down stone referred to must, of necessity, have been exploited very close to the present workings, and also that the Box Ground stone dealt with most probably was obtained from the "Cathedral" (Quarry No. 30), or near by. Bath stone has been raised in enormous quantities at Bathampton Down, and the remains of inclined plane to the valley below, as

Analysis these, we find that the Box Ground stone is credited with the lowest crushing weight, namely, 54 tons per square foot, whilst the highest is the Monk's Park, with 210.9 tons per square foot. The sample of Box Ground tested, however, must have been very abnormal, for the other results on the same stone come out at a much higher figure. The experiments of Professor Beare are the most recent, and probably apply to the materials as at present quarried; it is to be regretted that the experimenter did not himself select the samples in the quarries.

Other Physical Properties.

This section is, perhaps, the most important contribution we have to offer in regard to our knowledge of Bath stone. The reader is requested to interpret the results recorded in the following table (Table No. 3) in the light of our observations "On the Structure and Physical Properties of Building Stones," contained in a series of articles published in the *Builder*, January—June, last year.

In regard to these experiments it may be noted that they are, every one, original, and were carried out by ourselves on samples collected during our visit to the district. Moreover, we have recorded the results afforded by every sample dealt with. It appears that the stone which absorbed the

least amount of water during one week immersion is from the Mount Pleasant quarry (No. 10), on Coombe Down, which only imbibed 6.35 per cent. of its bulk. The Westwood Ground paving bed (quarry No. 23), runs it very close with 6.45 per cent. but this latter is not, strictly speaking, building stone, as previously remarked. The sample absorbing the most water was from Longplatt quarry (No. 25), Kingsdown—the uppermost "fine-grained" bed, third bed from the top. It is noteworthy, however, that the stone from Quarry No. 8 on Coombe Down should have taken in as much as 16.37 per cent., so that almost the highest and lowest results on absorption should be obtained from one area. We could not adduce a more striking illustration of the extreme variability of Bath stone in point of openness and general quality even in restricted portions of the district; and the necessity of careful selection is at once apparent. The stone from the last-mentioned quarry has also the lowest specific gravity (1.77). One of the most striking facts ascertained by the absorption experiments was that all Bath stones imbibe nearly as much water in half-an-hour as they do in one week, in which respect they somewhat resemble Portland, though the latter stone, as a whole, is far less absorbent. Again, the differences in the results for 30 min. and the day on Bath stone are very slight; in some cases absorption during immersion beyond 30 min. and up to one day was absolutely arrested, after which we notice an increase in the amount at the end of a week. This shows, beyond the shadow of a doubt, that some agent was at work in opening up the pores of the stone, or rendering it more absorbent, during the final six days of the experiments. We have been at much pains to ascertain the cause of this, and beg to offer the following explanation. It was observed that after being in the water a few minutes, the majority of the stones commenced to disintegrate slightly; but there was a material increase in the amount disintegrated after that, for some 3 or 4 days. On the expiration of that period, however, it would appear that the rate of wasting became slightly accelerated, but after the sixth day it ceased. We are speaking now as to the general effects produced: certain samples were not subject to this peculiarity, and constitute remarkable exceptions to the general rule. Some of the salts in the stone are soluble in water, and it may be that the had, as far as possible, to be removed before maximum absorption could be arrived at. It is probable that in some instances progressive absorption may account for the phenomenon, but this cannot apply to many samples. The rate of absorption was, in other respects, very peculiar, and it will be seen on a casual inspection of the table that the results obtained on the first dip (1 second) are by no means indicative of what will take place during a week—except, of course, in a general way. To this there are a few notable exceptions. On studying the table, several other points may be brought out, but we think the results, to a large extent, explain themselves.

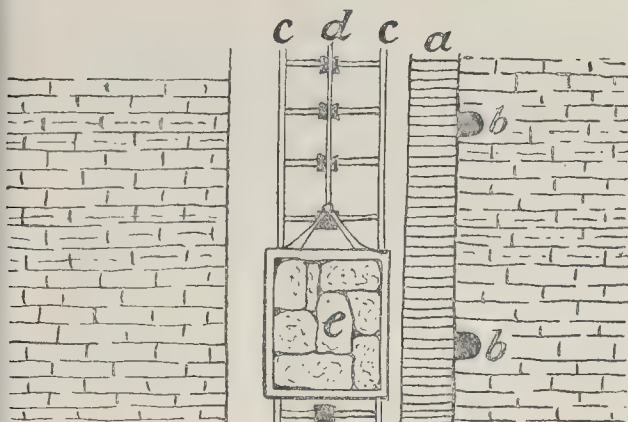


FIG. 14.—Plan of portion of Inclined Shaft, giving details.

=Steps down to the mine. *b*=Manholes. *c*=Tram-rails. *d*=Steel cable, working on rollers, and attached to a truck laden with stone (*e*), which is being hauled up the incline by an engine at the surface.

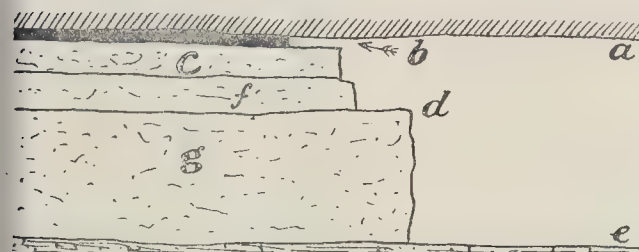


FIG. 15.—Section of heading underground, showing method of quarrying Bath stone.

=Roof of working. *b*=Jad. *c*=Picking bed. *d*=Picking standing. *e*=Bottom of quarry. *f*, *g*=Blocks about to be quarried.

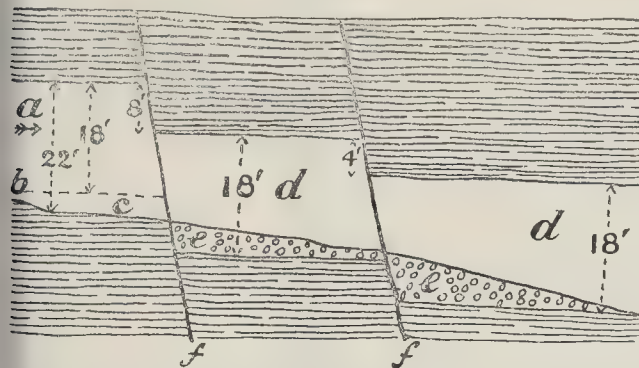


FIG. 16.—Quarrying underground through step-faults.

f, *f*=Faults. *a*=Gallery worked in the direction of the arrow, in good stone. *b*=Floor at that time. *c*=Useless stone blasted away, lowering floor to assist in working out faulted stone at *d*, *d*. *e*, *e*=Rubble filled in (after abstraction of stone) to level of floor at *e*.



FIG. 17.—Method of conveying stone from Park Lane Quarry (No. 47) to the Corsham railway station.

=Trucks being pulled up incline by the stationary engine *b*. *c*=Truck running down inclined plane to railway station yard *d*. *x*=Entrance to quarry.

Murhill, may still be seen. On Coombe Down, also, many large abandoned quarries exist.

NOTES.

MR. PETRIE'S discovery of an ancient non-Egyptian town in Egypt, as described in the *Times* report of his lecture to the Royal Society of Edinburgh, is one of the most sensational discoveries that has ever been made in Egypt. Mr. Petrie first described the discovery of the site of the small but very ancient Egyptian town of Nubt-Ombos, which contained pottery remains of the IVth, XIIth, and XVIIth and XIXth dynasties, so that its history must have extended over a very long period. But a quarter of a mile from this lay the remains of another town in which not a single relic was like any of those in the Egyptian town; the remains were as remote in style as if they had belonged to Syria or Persia. Various cemeteries were discovered here, and from the nature of the remains found it was deduced that this city belonged to the period between the VIth and IXth dynasties, or about 3000 B.C. Mr. Petrie argues that these were probably the people who overthrew the Egyptian civilisation and produced the "dark age" of Egyptian history of the VIth and VIIth dynasties. This is a new point of departure in Egyptian archaeology, and will doubtless lead to a search for other remains of the same (apparently) invading race.

THE Blue-book containing the report of the Department of Public Works, New South Wales, shows the system of illustrated official reports of this class very fully carried out. Photographs of all the principal engineering works and the two or three architectural works mentioned in the Report are appended, together with a number of plans and geometrical drawings of construction. This kind of illustration adds greatly to the value and interest of a Works Department report. Among the undertakings illustrated are the Bay Harbour Works, the Garden Island Naval Station and Stores, the New Town Post and Telegraph Office, the Sydney Hospital, of which complete plans are given as well as a photographic view, the New Lands Offices, Sydney (a rather good building except for the design of the square cupola), various bridges, the wrought-iron aqueduct at Walli Creek, the aqueduct at Rocky Point Road, and various others. The New South Wales Works Department may be congratulated on having produced a very interesting volume.

THE most interesting recent discovery in experimental chemistry is the method of making calcium carbide on a commercial scale. The discovery, like many others in chemistry, was made accidentally. Mr. Willson, of the Willson Aluminium Company, in attempting to get metallic calcium in his electric furnace from a mixture of dry lime and coal-dust, obtained a greyish solid mass, which proved on analysis to be calcium carbide. This substance in contact with water develops acetylene, the hydrogen of the water combining with the carbon to form this gas, while the oxygen of the water forms lime by combination with the calcium. Acetylene is the most powerful illuminant of the gaseous hydro-carbons, hence the compound from which the gas can be obtained so easily is of great commercial importance. The carbide is very portable, and could be supplied to houses in cylinders or in sticks for use in lamps. A stick of the carbide held in the hand and sprinkled with a few drops of water evolves a gas which can be lit by a match, and will continue burning as long as it is kept moist. For commercial purposes, the carbide could be supplied in sticks about 12 in. long and 1½ in. in diameter, weighing about a pound. Such a stick will generate five cubic feet of the gas. Professor Vivian Lewes, in his lecture

on the commercial importance of calcium carbide to the Society of Arts, calculated that if it could be procured for 4*l.* a ton, then, as a lighting agent, it would be equivalent to London coal-gas at 6*d.* per thousand. At this price it would, of course, prove a most formidable rival to coal-gas and electric lighting. In a country house, for example, it would be only necessary to have a closed vessel charged with the carbide and provided with an automatic stop-cock to supply it with water. This receiver connected to the piping of the house through a small gas-holder to regulate the pressure, would form a most efficient lighting arrangement. Luckily, too, as Professor Lewes pointed out, acetylene has a most pungent smell, so the smallest leakage would be easily detected, and there would be practically no danger from poisoning. The only point about which the opinion of experts still differs is the price the carbide would cost to make. A writer in the *Journal of the Franklin Institute*, taking electric power to cost 6*l.* 5*s.* per horse-power per annum—it can be got for 4*l.* 10*s.* at Niagara—calculates the price to be 8*l.* 6*s.* per ton; and, assuming its illuminating power to be ten times that of ordinary gas, this would be the same as gas at 1*s.* 3*d.* per thousand. This is the bare cost of making; the final cost, as delivered to consumers would be higher. From the Gas Light and Coke Company's accounts we find that the net cost of manufacture at the works is generally about a shilling per thousand cubic feet of gas ultimately sold. So that, on this estimate, the new lighting agent seems to be dearer than the old one. Still, even at this price, which, by the way, is more than double the estimate of Dr. Henry Morton, of Stevens' Institute, it will be very valuable for enriching coal-gas, and to electrical engineers the manufacture of the carbide opens a wide field for improving the load factor of their central stations. That they are not slow to recognise the possibilities of the new product, the "Carbid" company which has been started in Berlin shows. In this company the well-known electrical firms of Siemens & Halske, and the "Allgemeine Electricitäts Gesellschaft" are interested.

A PAMPHLET on Mr. Stanley Churton's "Hydrargyrum-cum-Zinc Process" for preserving timber has been issued by Sir W. Burnett & Co., of Millwall. Its object is to recommend the combination of two well-known methods of preserving timber, viz., "Burnettising," which involves the use of chloride of zinc, and "Kyanising," which utilises the well-known antiseptic and germicide corrosive sublimate or mercuric chloride. There is no apparent reason why the two processes should not be combined, but as no comparative experiments are quoted we have no data upon which to base an opinion as to the superiority, or otherwise, of the combination over the parent methods. The whole tenor of the pamphlet is, indeed, to the effect that the combined process should be, might be, ought to be, advantageous. What practical men want to know is whether it has been proved to be superior to other processes, and if so, when, where, for how long, and at what cost. In the *Builder* of August 21 and 28, 1886, the subject of the preservation of wood was very fully gone into, and it was there pointed out that deal planks which had been "Kyanised" and employed in a damp, unfavourable situation remained sound for some seven years, while similar planks which had been creosoted were found to be perfectly sound after the expiration of twelve years' exposure. According to Boulton, all processes which involve the use of salts of metals have invariably failed when exposed to the prolonged action of sea-water. Another serious defect which has to be faced when the chlorides of zinc and mercury and similar salts are employed as timber preservatives, is the rapidly corrosive action, especially in

damp situations, which these salts exercise upon iron and copper nails and other metal work.

A BLOCK of offices, to be named "Catherine House," has just been built, after, as we are informed, Mr. C. J. C. Pawley's designs, on the site of Nos. 13-4, Trinity-square, Tower-hill. Of those two old houses, No. 13 stood at the south-west corner of Catherine-court, marked by a tablet with date "1725," where its carved wooden doorway still remains. Next southwards, and entered from Tower-hill, was No. 14, to which belonged a history that has now become but little known. It was the house used by the Sheriffs for the custody, on the eve of execution, of those who were condemned to be beheaded on Tower-hill. In that house were so received Lord Kenmuir, Lord Derwent-water, his younger brother Charles Ratcliffe, and Lord Lovat. From its door Lord Kilmarnock, dressed in a suit of black, together with Lord Balmerino wearing a military uniform of blue with red facings, walked to the scaffold, having been delivered to the Sheriffs on the evening before from Wakefield Tower, in the Tower. The situation of the scaffold, directly opposite Catherine-court, is marked in Trinity-square Garden by a square of pink and grey granite blocks in which is set a stone thus inscribed:—

SITE OF ANCIENT SCAFFOLD
HERE THE
EARL OF KILMARNOCK
AND
LORD BALMERINO
SUFFERED
18 AUGUST 1746.

Some portions of the scaffold were dug up in making the railway (Inner Circle completion) in 1883. The two houses are drawn in Canot's print, after Budd, of the execution of sentence on August 18, 1746, and in Kip's earlier view. On the front of No. 13 was a carving in stone of the Mercers' Company's arms—a demi-virgin, crowned, her hair dishevelled, issuing out of clouds; a similar stone, much older in date, was on the front of No. 14, and has been re-fixed in the front of Catherine House.

ONE has got to look rather doubtfully upon Agricultural Hall shows, but the so-called "Art-Furniture" exhibition seems to be the most complete pretence that has ever been advertised there. A good many of the not very numerous exhibits are the same that were at the Building Exhibition, mostly of a practical kind. The "Art-Furniture" consists of some half-dozen stands of ornamental "shop" furniture of ordinary type. We did not expect much in the way of Art, certainly, from the terms of the prospectus in which the exhibition was originally announced, but we did expect something a little better than this. Under the circumstances any special comment on the contents of the exhibition would be waste of time.

AMONG our miscellaneous accounts of a recent work done, on another page of this issue, is a description of a new stained glass window put up in a church in Liverpool, in which the figure of Christ is described as "vested in dalmatic and cope." We never of course enter in these pages into any discussion as to points of religious doctrine or ritual. But as a matter of artistic common-sense it is surely time that some protest were made against the absurdity, in a chronological if in no other sense, of representing the figure of Christ as clad in special official vestments invented in the Church centuries after the date of his life on earth. We observe that the window is described as "carried out in the fifteenth century manner." The conception of Christ and of his relation to church history seems to be "in the fifteenth century manner" also.

DWELLING-HOUSES ON LOW-LYING LAND.

WE have received from the Clerk to the Tribunal of Appeal for the London Building Act copies of the following regulations which have been made by the County Council, under Section 123 of the London Building Act, 1894, with the concurrence of the Tribunal of Appeal, prescribing the course to be followed by applicants for permission to erect or adapt dwelling-houses on low-lying land:

"Regulations made by the Council under Section 123 of the London Building Act, 1894 (57 and 58 Vict., cap. cxxiii.), with the concurrence of the Tribunal of Appeal constituted under Section 175 of the said Act, prescribing the course to be followed by applicants for permission to erect or adapt dwelling-houses on low-lying land.

Every person who shall be desirous of erecting or adapting any building to be used wholly or in part as a dwelling-house on any land in the County of London of which the surface is below the level of Trinity high-water mark, and which is so situated as not to admit of being drained by gravitation into an existing sewer of the Council, shall first make a written application for a licence. Such application shall be addressed to the Clerk of the Council.

Such application shall contain a statement as to the nature and extent of the interest of the applicant in the building or buildings proposed to be erected or adapted, and be accompanied by a plan and section of the lowest floor of such building or buildings and the curtilages thereof to a scale of 1*in* to an inch to a foot, and by a block plan to a scale of not less than $\frac{1}{16}$ (which may be on a sheet of sheets of the Ordnance Survey, or may be drawn on tracing linen), showing the position of such building or buildings and the local sewer into which it is proposed to drain such building or buildings, and the connexion of such local sewer with an existing sewer of the Council.

Such plans and sections shall be accompanied by a description of the materials to be used in the construction of such building or buildings, and shall be coloured in accordance therewith. The point of the compass shall be marked on the block plan.

The position and course of the drainage system proposed to be adopted for the disposal of sewage and rain-water, and its connexion with the local sewer or an existing sewer of the Council, shall be clearly shown on the plans and sections, and the diameter and inclination of the drain-pipes shall be figured thereon.

The plan and section shall also indicate in figures the level above or below Ordnance datum at which it is proposed to construct the floor of the lower rooms.

The decision given by the Chief Engineer of the Council upon such application shall be reported to the Building Act Committee, and the Committee shall report it to the Council, and thereupon, if it is the effect that the erection or adaptation may not be permitted, the Clerk of the Council shall by letter inform the applicant that the Council, acting upon the decision of the Engineer, has refused permission. If it is the effect that the erection or adaptation may be permitted, a licence under the seal of the Council embodying the conditions of the Engineer's decision shall be issued to the applicant.

The seal of the London County Council was hereunto affixed on the 3rd day of April, 1895.

H. DE LA HOOK, Clerk of the Council.

Signed on behalf of the Tribunal of Appeal, in token of their concurrence in the foregoing regulations.

ARTHUR CATES, Chairman of the Tribunal.

April 8, 1895.

The following regulation has also been made by the Council under Section 122 of the London Building Act, 1894, with respect to the erection or adaptation of dwelling-houses on low-lying land:—

"It shall not be lawful to place the underside of the lowest floor of any permitted building at such level as will render it liable to flooding, and every permitted building shall be efficiently and properly drained to the satisfaction of the Engineer for a time being of the Council, either into a local sewer or into a main sewer of the Council.

March 26, 1895."

ARCHITECTURAL ASSOCIATION: DISCUSSION SECTION.—At the tenth meeting of the Session of this section, held at 56, Great Marlborough-street, (the 10th inst., Mr. W. Henry White in the chair, V. H. J. Leaning, F.S.I., read a paper entitled "Notes on the Conditions of Building Contracts." The discussion was opened by Mr. Brodie, and sustained by Messrs. Greenop, Scott, Tyars, and Garbutt. A vote of thanks having been unanimously passed to the author of the paper, Mr. Leaning replied and the meeting terminated.



Embossed Frieze: Designed by Mr. Stephen Webb.

DESIGN FOR AN EMBOSSED FRIEZE.

This is an example of a style of frieze of which several have recently been designed by Mr. Stephen Webb. The one illustrated is distinguished as the "Piper Frieze." This class of friezes, which were designed for, and are made by, Messrs. Jeffrey & Co., are supplied either in colour or enriched with gilding, or in plain white for subsequent decoration. They are also made in the form of thin embossed copper plates, a treatment for which the character of the design is very well suited.

COMPETITIONS.

DISTRICT COUNCIL BUILDINGS, NEW HUNSTANTON, NORFOLK.—A limited competition for the District Council Buildings for this place has just been decided, the plans of Messrs. George H. & W. Skipper, architects, of Norwich, being selected. Four other architects (all or London), were invited to submit plans. The amount to be expended is 2,000l.

INFECTIOUS DISEASES HOSPITAL, PENZANCE.—The first premiated design in this competition ("Eclipse") is by Mr. Hampden W. Pratt, Rolls Chambers, 89, Chancery-lane, W.C. The second ("Aspect"), being by Mr. F. Hunter Lines, 102, Darlington-street, Wolverhampton; and the third ("Lion Rampant") by Mr. F. E. Pearce Edwards, Liverpool, and Mr. Arnold Thornely, Birkdale. The assessor was Mr. T. W. Aldwinckle.

SCHOOL BUILDINGS, PORTMADOC.—A meeting of the Court of Governors of the Portmadoc Intermediate School was held on the 10th inst., for the purpose of selecting plans for the proposed erection of new buildings at a cost of 2,400l. Colonel Ellison, of Liverpool, adjudged the plans of Mr. A. Teather, of Cardiff, to be the best of the twenty-three sent in, and the committee has accepted them.

ARCHITECTURAL SOCIETIES.

SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.—At the annual meeting of the members of this Society, held last week, the eighth annual report of the Council was read by the hon. secretary (Mr. C. J. Innocent). It congratulated the members on the satisfactory condition of the Society, both financially and numerically. Several members had been advanced during the year from the student to the associate class, and new members had been received. Two lay members had also been admitted—Messrs. B. Bagshawe and W. J. Gardner—and the Council think that many other citizens would become members if they knew it was open to them. Dr. H. C. Sorby has become an honorary member, and has intimated his willingness to assist the Society. The report dealt in detail with the work of the Society for the year. The sketching class had done a considerable quantity of good work. The prizes offered—3l. 3s. by the President (Mr. Gibbs) and 1l. 11s. 6d. by the Society—were awarded, the former to Mr. F. W. Chapman and the latter to Mr. J. C. A. Teather. In the designing class the prizes—2l. 2s. and 1l. 1s.—were awarded to Mr. J. C. A. Teather and Mr. J. V. Woffenden. The Council expressed their pleasure at the improvement in the work of the students, and the students recorded their

appreciation of the kindness of Mr. Gibbs, to whose interest in them much of the improvement was due. The report also alluded to the award of the School Board with respect to a school at Tinsley Park, which was so much at variance with the conditions that the competitors sent a protest to the Board, and the Council forwarded a letter of complaint, but no satisfactory reply was received. The Council hope to visit this summer Wentworth House and Hardwick Hall, where Mr. Bagshawe will read a paper to the members, and lectures are expected by Dr. Sorby, Mr. Paul Waterhouse, and Mr. Hugh Stannus. The treasurer's statement was read by the treasurer, Mr. F. Fowler. It showed the balance in hand at the present time to be 64l. 0s. 6d., being an increase of 59l. 12s. 6d. above the balance at the beginning of the year. The result of the ballot for officers for the ensuing year was:—President, Mr. Charles Hadfield; vice-president, Mr. R. W. Fowler; treasurer, Mr. F. Fowler; hon. secretary, Mr. C. J. Innocent; Council, the above officers and Mr. T. J. Flockton and Mr. E. M. Gibbs (ex-officio), and Messrs. T. Winder, J. Smith, W. H. Lancashire, H. W. Lockwood, and W. C. Fenton. Messrs. F. W. Chapman, C. M. Hadfield, C. F. Innocent, J. B. Mitchell Withers, and J. R. Wigfall were elected a committee to manage the sketching class.

EDINBURGH ARCHITECTURAL SOCIETY.—On the 13th inst. about fifty members of the Edinburgh Architectural Association visited George Heriot's Hospital School under the leadership of Mr. Donald A. Gow. Leaving the school, the visitors proceeded to the Royal Hospital for Sick Children in course of construction at Rillbank, where they were met by the architect, Mr. G. Washington Browne. Describing the plans of the hospital, Mr. Browne stated that the wards ran from east to west in order that they might have as much light and sun as possible. There were four large wards, each with twenty-four beds; one spare ward, and small wards for observation and isolation, providing in all for about 120 patients. The nursing staff was larger in a children's hospital than in one for adults, and there it would consist of five sisters, twenty-one day nurses, and eight night nurses. With resident doctors, matrons, &c., there would be a medical and nursing staff of forty. He described the accommodation for these, pointed out as a new feature in such buildings a play alcove for convalescent children, stated that the kitchen was on the top of the house, and that for twelve domestics who would be required there was a servants' hall. The cooking had to be done principally by gas. All through the building the ventilation had to be by natural, and not mechanical means, and the heating, in four sections, by low-pressure hot water in coils and pipes. The artificial light was to be electric, and for that they were laying down their own plant, with two boilers, engines, and dynamos. Either engine might be driven by either boiler, so that they were safeguarded from a breakdown of the light. There would be 404 lamps of 16 and 8 candle-power. They were also laying down their own steam laundry in Sylvan-place. In afterwards showing, on the various floors, how the plans had been realised, he drew attention to the absence of ornamental plaster work, and remarked that the hospital was constructed in a purely utilitarian spirit. Mr.

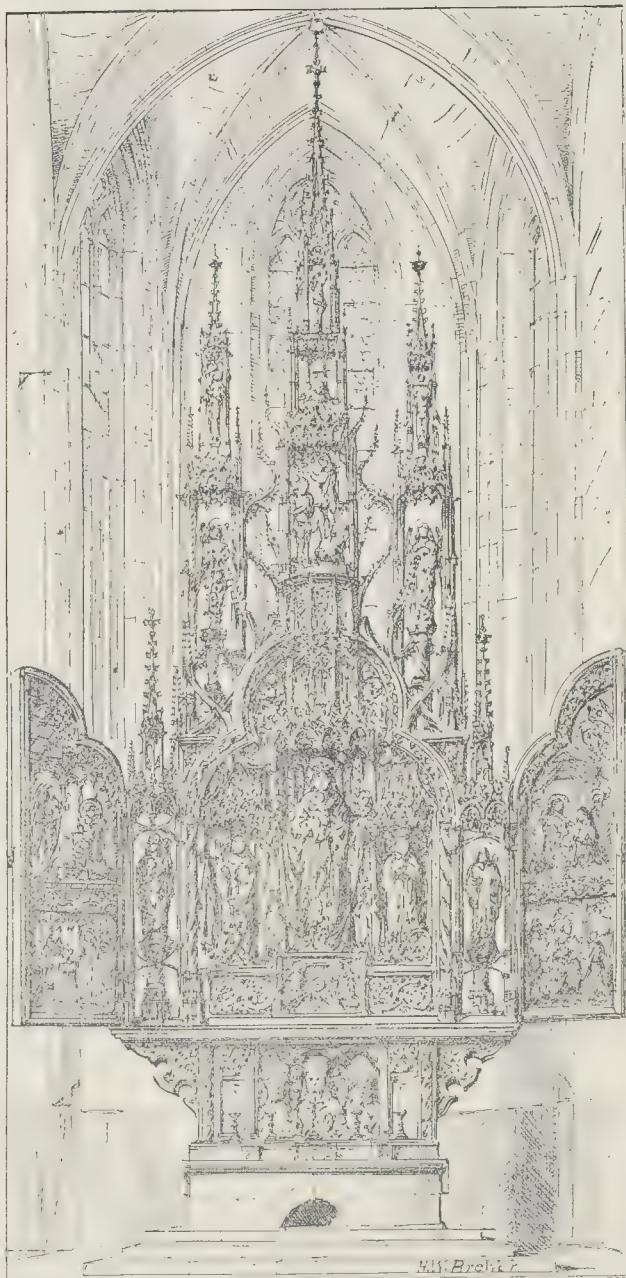
Browne was awarded a vote of thanks on the proposal of Mr. Robertson.

ARCHITECTURAL CLASSES, GLASGOW AND WEST OF SCOTLAND TECHNICAL COLLEGE.—The first sketching and measuring visit of the architectural classes of the Glasgow and West of Scotland Technical College, for the summer, took place on the 15th inst., when a good number of the students, accompanied by the lecturer, Mr. Gourlay, and the instructor in the studio, Mr. Lochhead, left for Lillithgow Palace and Church. The party first visited the Palace, where the lecturer read a specially-prepared paper on the architecture of the building. Thereafter the church was carefully gone over, and prepared notes were read by the lecturer, he having been aided in their preparation by information kindly supplied by Mr. John Honeyman, A.R.S.A., the architect for its restoration, and one of the Governors of the College.

NOTTINGHAM ARCHITECTURAL SOCIETY.—The Twenty-second Annual Meeting of this Society was held on the 3rd inst., Mr. A. N. Bromley, F.R.I.B.A., in the chair. The Council reported as to the business transacted in the year, and a statement of accounts was read. Votes of thanks were accorded to the President, Vice-President and Secretary, and also to the Institute of Architects for the "Journal," and the Architectural Association for "A.A. Notes," and other societies (allied) for their Annual Reports. A ballot was taken for the election of President, Vice-President, Council, Auditors, and Secretary, when the following were elected:—President, Mr. John Howitt, F.R.I.B.A.; Vice-President, Mr. A. N. Bromley, F.R.I.B.A.; Council, Mr. A. R. Calvert, Mr. A. H. Goodall, Mr. W. D. Pratt, Mr. H. Walker, F.R.I.B.A., and Mr. F. B. Lewis, A.R.I.B.A.; Auditors, Mr. A. W. Brewill, F.R.I.B.A., and Mr. John Sander; Hon. Secretary and Treasurer, Mr. A. Ernest Heazell.

ARCHÆOLOGICAL SOCIETIES.

LONDON AND MIDDLESEX ARCHÆOLOGICAL SOCIETY.—An evening meeting of this Society took place on the 9th inst. at the London Institution, Finsbury Circus, when Mr. J. G. Waller, F.S.A., presided, and the Rev. Canon Benham, B.D., Rector of St. Edmund the King and Martyr, delivered an extempore address on "The Ancient Memorials of his Parish," and produced some records of St. Edmund the King and St. Nicholas Acons. These parishes, he said, formerly had two churches, but both were destroyed in the Great Fire of 1666; that of St. Edmund's only was rebuilt, and since then the two parishes had run together. The registers of St. Nicholas Acons dated back to the year 1589, and those of St. Edmund's to 1670. The former showed many entries connected with the Vanbrugh family, Sir John Vanbrugh, the architect, having been baptised here. Several entries showed how unwilling people were to hold offices in former days, and paid fines. Amongst others, Charles Vanbrugh paid his fine for not serving the office of churchwarden. Many extracts were read referring to the Great Plague and other matters. Mr. Herbert Jones, F.S.A., next read a paper on "Roman Remains recently found in Threadneedle-street." These were dis-



The Reredos, Schneckin Chapel, Augsburg.

covered during excavations which were recently made on the site of No. 62, Threadneedle-street, between the Sun and the North British Insurance Offices. A Roman bath (in cement) was found about 30 ft. below the surface; this was destroyed by the excavators in the course of the work; a photograph of this was shown to the meeting, as also some portions of the bath, and Roman tiles, &c. Mr. M. A. Saunders read a short paper describing the removal of the last of the City Almshouses for the "Deserving Poor," known as Ayre's Charity, in Moorgate-street Buildings, recently pulled down. We believe the Charterhouse is now the only Asylum left within the walls of the City.

ENGINEERING SOCIETIES.

CIVIL AND MECHANICAL ENGINEERS' SOCIETY.—At the ordinary meeting of this Society, on the 10th inst., a paper was read on "Laundry Machinery," by Mr. H. Coward, in which he dealt with various forms of washing, wringing, and ironing machines, with the drying of linen and the various principles involved in carrying out, in a thorough and satisfactory manner, the proper cleansing of wearing apparel and other articles which are included in the general term of "household linen." A special point of interest in the paper was that of a process of boiling flannel without hardening or prejudicially affecting it, this being

done without the use of any chemicals or addition to the water [other than those usually employed]. Diagrams and models in illustration of the subject were exhibited, and a long discussion ensued, in which the President, Mr. C. T. Walrond, A.M.Inst.C.E., the Honorary Secretary, Mr. E. H. G. Brewster, A.M.Inst.C.E., M.I.M.E., &c., Mr. E. Taylor, Mr. A. W. Ackermann, A.M.Inst.C.E., Mr. R. E. Phillis, A.M.Inst.C.E., and others, took part.

Illustrations.

THE FUGGER AND THE SCHNECKIN CHAPELS AT AUGSBURG.

THE fine old city of Augsburg contains three chapels erected during the Middle Ages by the great and wealthy family of the Fuggers. The first "Fugger Chapel" forms a church for the great almshouse called "The Fuggerei"; the second is attached to the nave of the beautiful Church of SS. Afra and Ulrich; and the third is situated at the west end of the nave of the Church of St. Anne. The last-mentioned is the one which we illustrate.

The Church of St. Anne was built between the years 1472 and 1510, but was very much modernised when it was made over to the Lutherans after the treaty of Munster. One very singular alteration appears to have been made at this time; the high altar was removed from the east end, and a new one was set up in the Fugger Chapel at the west end, forming that portion of the church into a quasi-chancel.

The walls of St. Anne's Church are covered externally and internally with plaster, and with the exception of the vaultings of the nave and aisles, no old work is now to be seen.

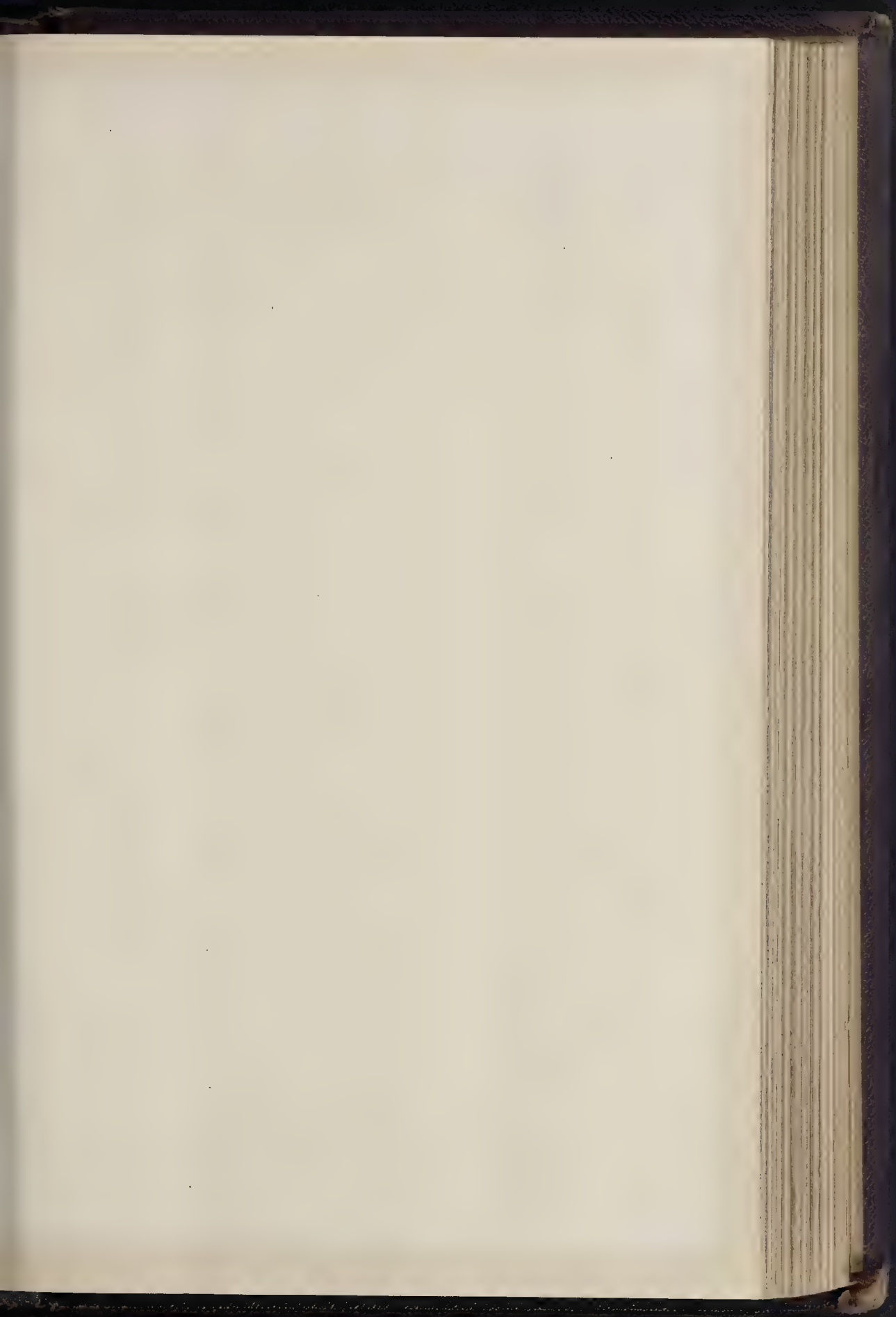
The Fugger Chapel was undoubtedly, before the alterations to which we have alluded, separated from the nave of the church by a screen, probably of metal; its floor is still raised two steps higher than the rest of the church. In the west wall of the chapel are four arched marble recesses, which are not in a line with each other, but form a very slight angle. These recesses are filled in with richly-carved monumental reliefs of a very uncommon character, any rate for Germany. They are in low relief and are executed in fine statuary marble. The two outer compositions represent the armorial bearings of the Fugger family, borne up by figures in Eastern costumes (a Persian and an Indian), in a building crowned by domed vaulting, the whole represented in perspective and filled in with trophies, wreaths, allegorical figures, &c., in the Italian style of the earlier part of the sixteenth century. The two inner recesses are occupied by reliefs representing sarcophagi with recumbent figures resting upon them, and sacred subjects filling in the upper portions of the arcades. One of these represents the Resurrection, but the other has been very much mutilated, and is not quite intelligible. Above these four recesses is a balcony of marble, forming a gallery in which is a fine old organ with painted wings, with a little choir-organ in front, which also has painted wings. This organ is adorned with a good deal of excellent carving, and in the "shades" of the centre compartment are two angels bearing a tablet inscribed with the date 1512. The whole of this work—recesses, screen, and organ—was built at the expense of three brothers of the Fugger family, and would appear to date between the years 1505 and 1512, which makes it very interesting, as it is probably the earliest example of pure Renaissance design in Germany, an indication of Gothic influence being anywhere visible. There is a tradition that the organ was "designed by Holbein," and that the wings of the small choir-organ were painted by the master.

As, however, there were three Hans Holbein all Augsburg men, the probability is that, if any of them had anything to do with this organ, it was the second, not the third, who is so well known in England by his magnificent portraits; in fact, he could not have designed this work, which is dated 1512, as he was only fourteen years of age at the time.

The very fine paintings upon the shutters of the great organ are by Hans Burgkmair, one of the most celebrated of the Augsburg school of painters of the earlier part of the sixteenth century.

The sculptured reliefs in the recesses of

* This is an "obit date," so probably the work is rather later.

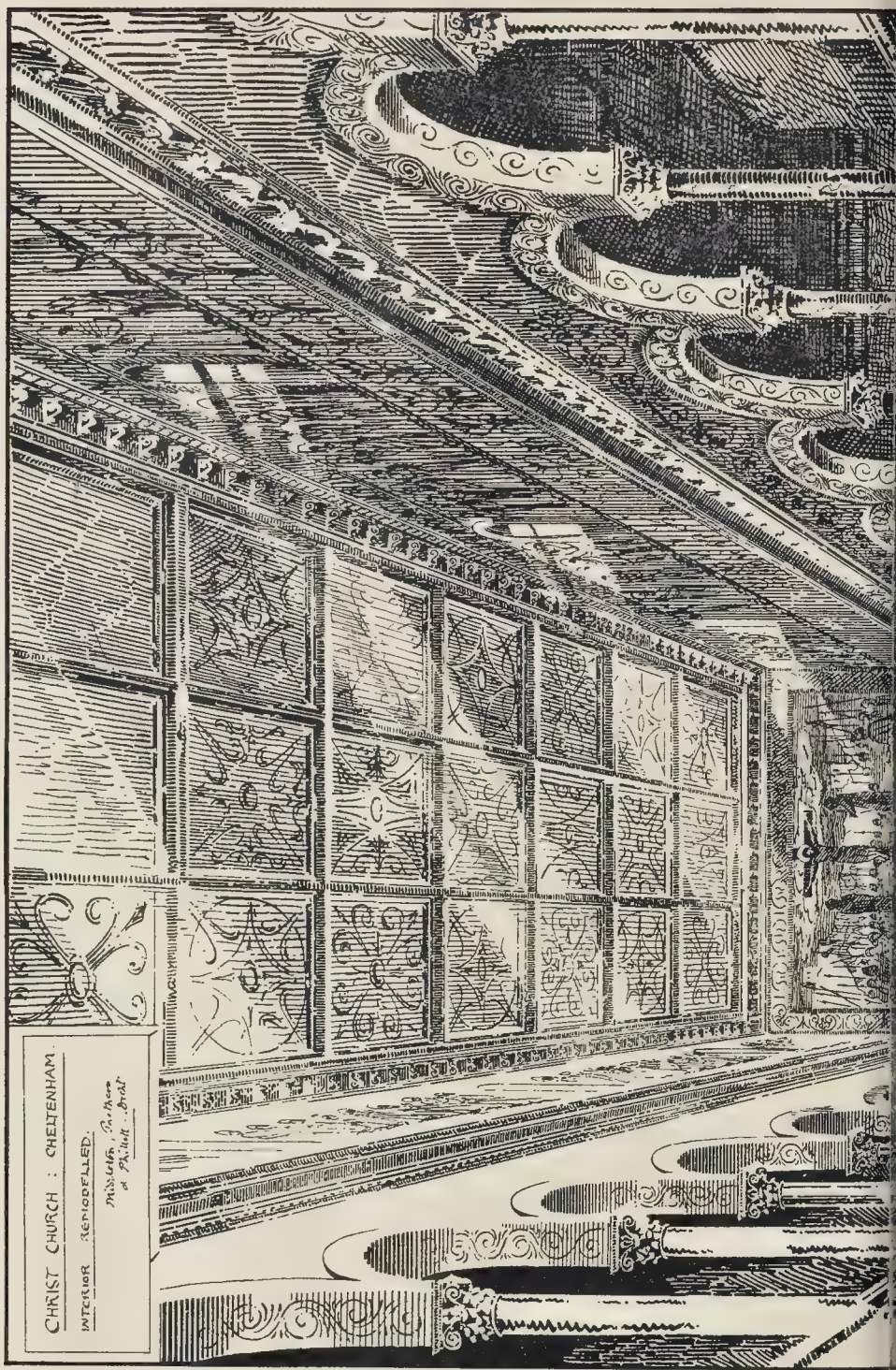


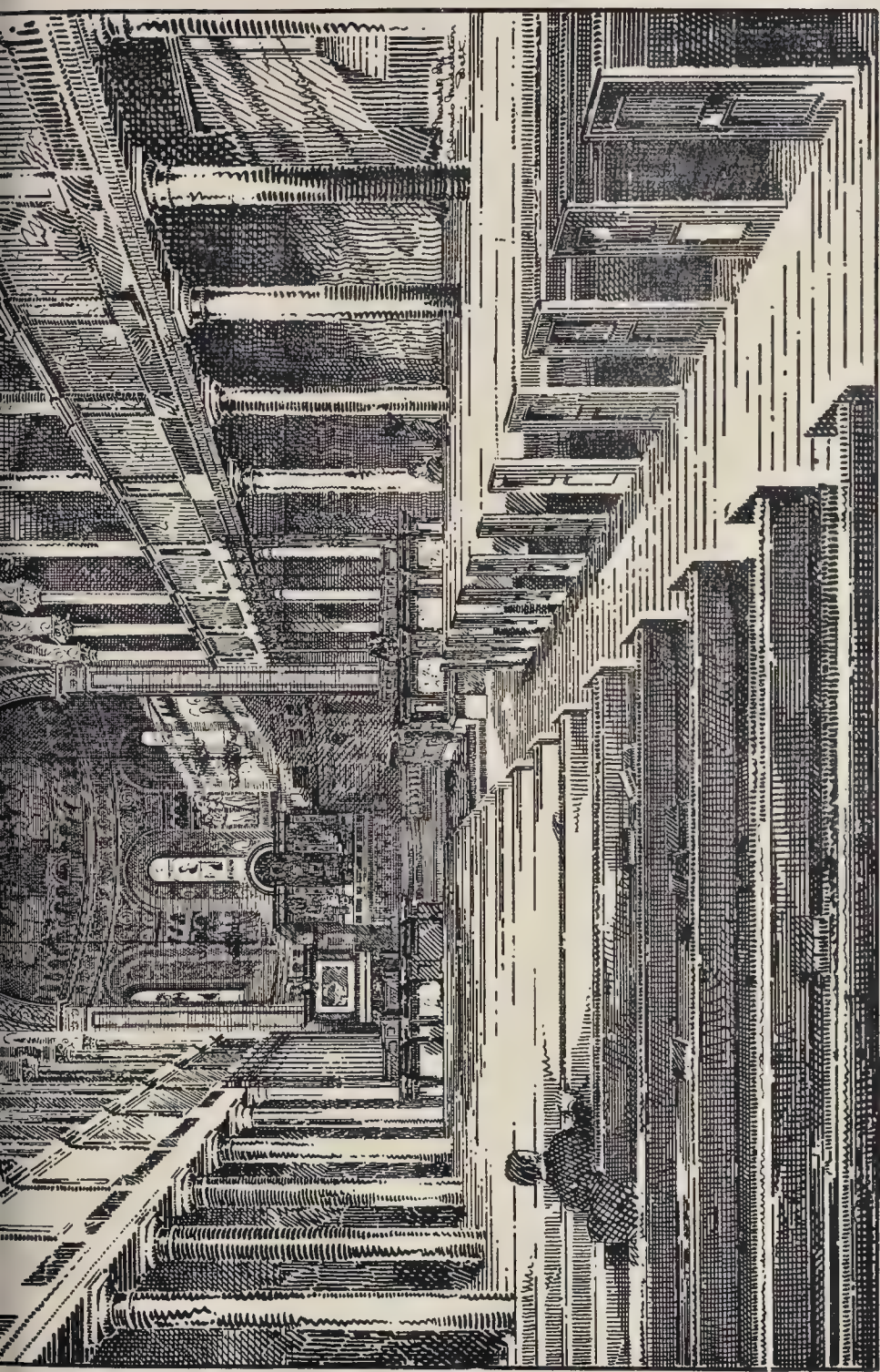
THE BUILDER, APRIL 20, 1896.

CHRIST CHURCH : CHELTENHAM.

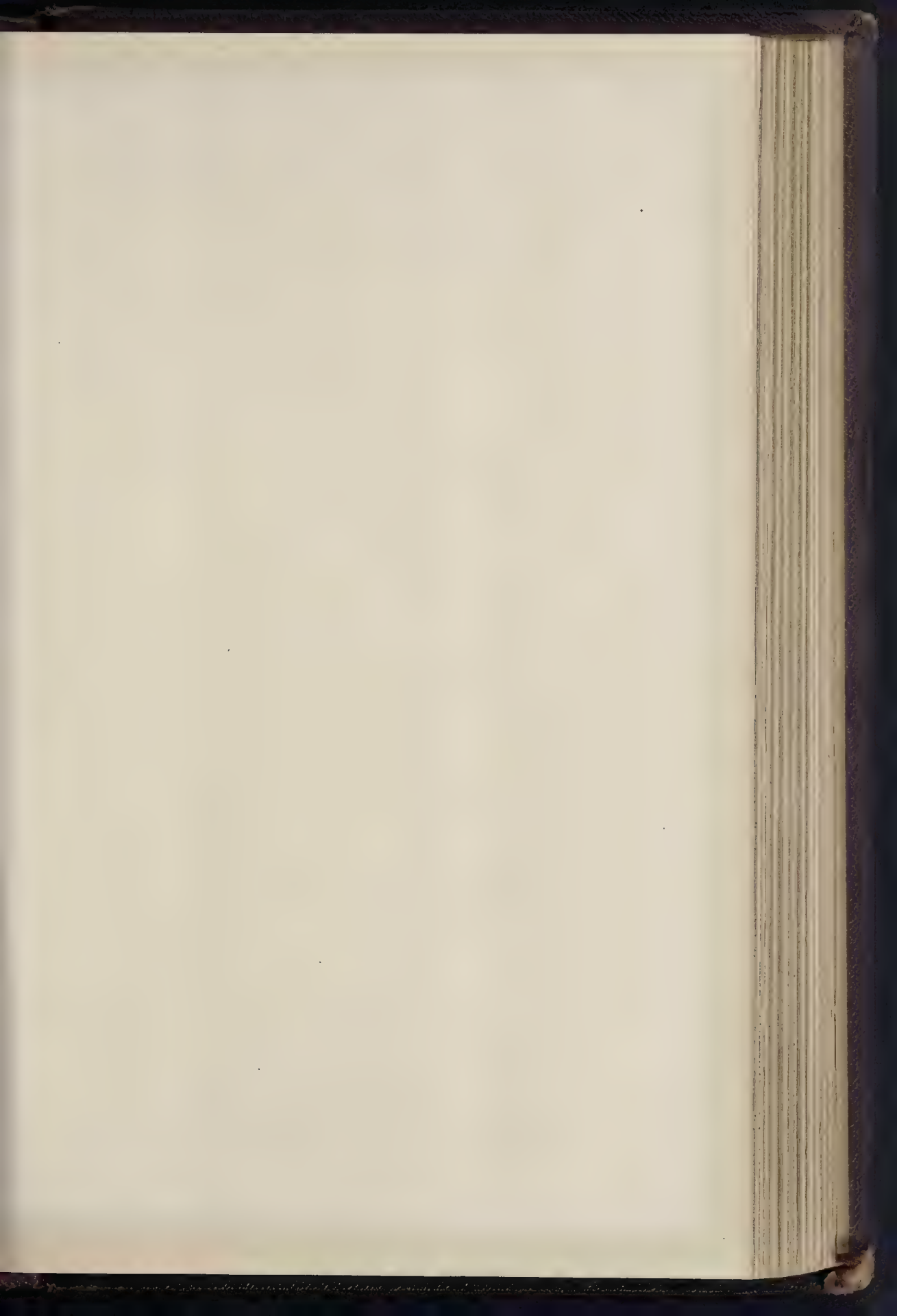
INTERIOR REMODELLING.

Designed by Messrs. G. & J. P. & Co. Ltd.

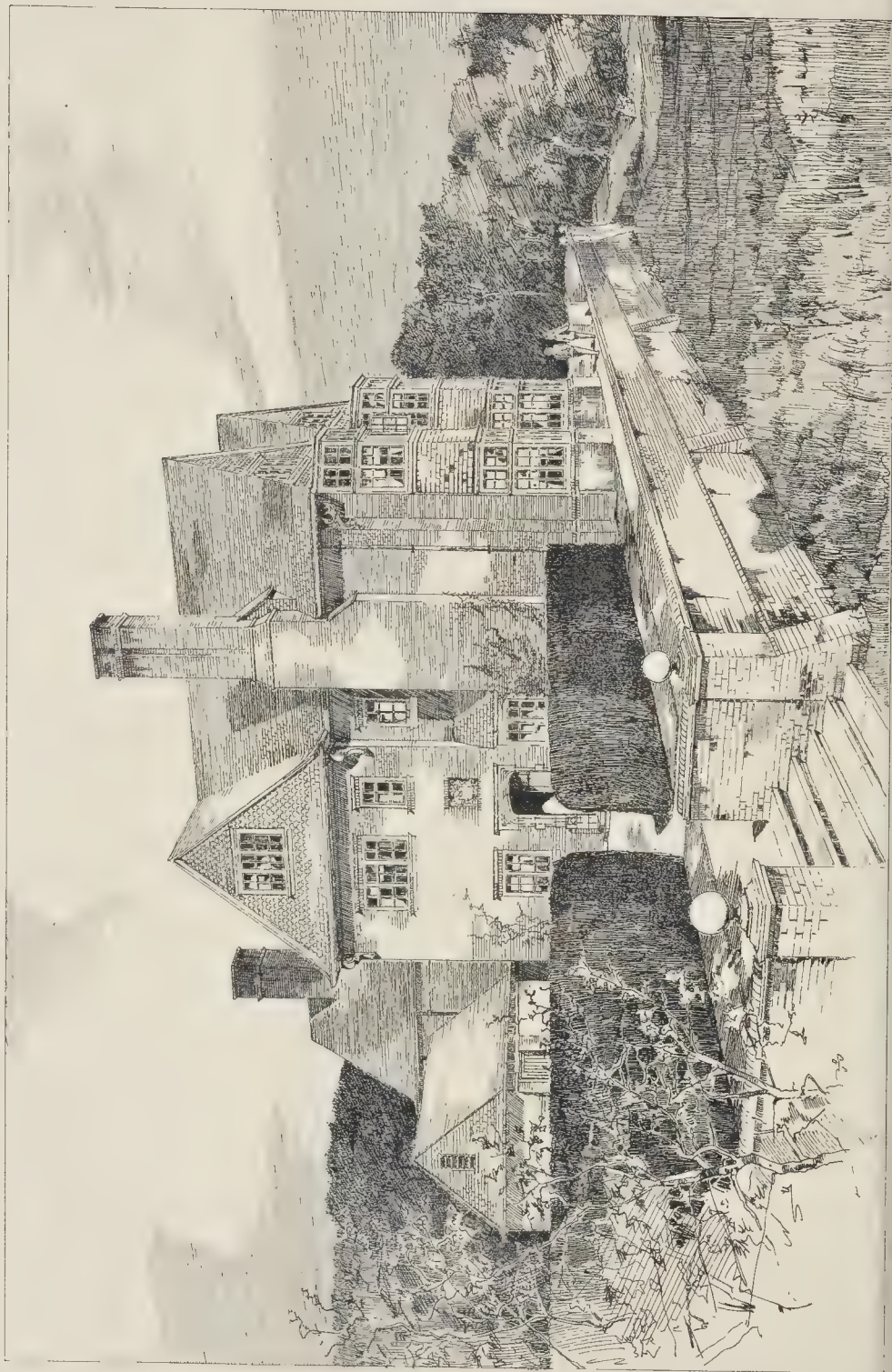


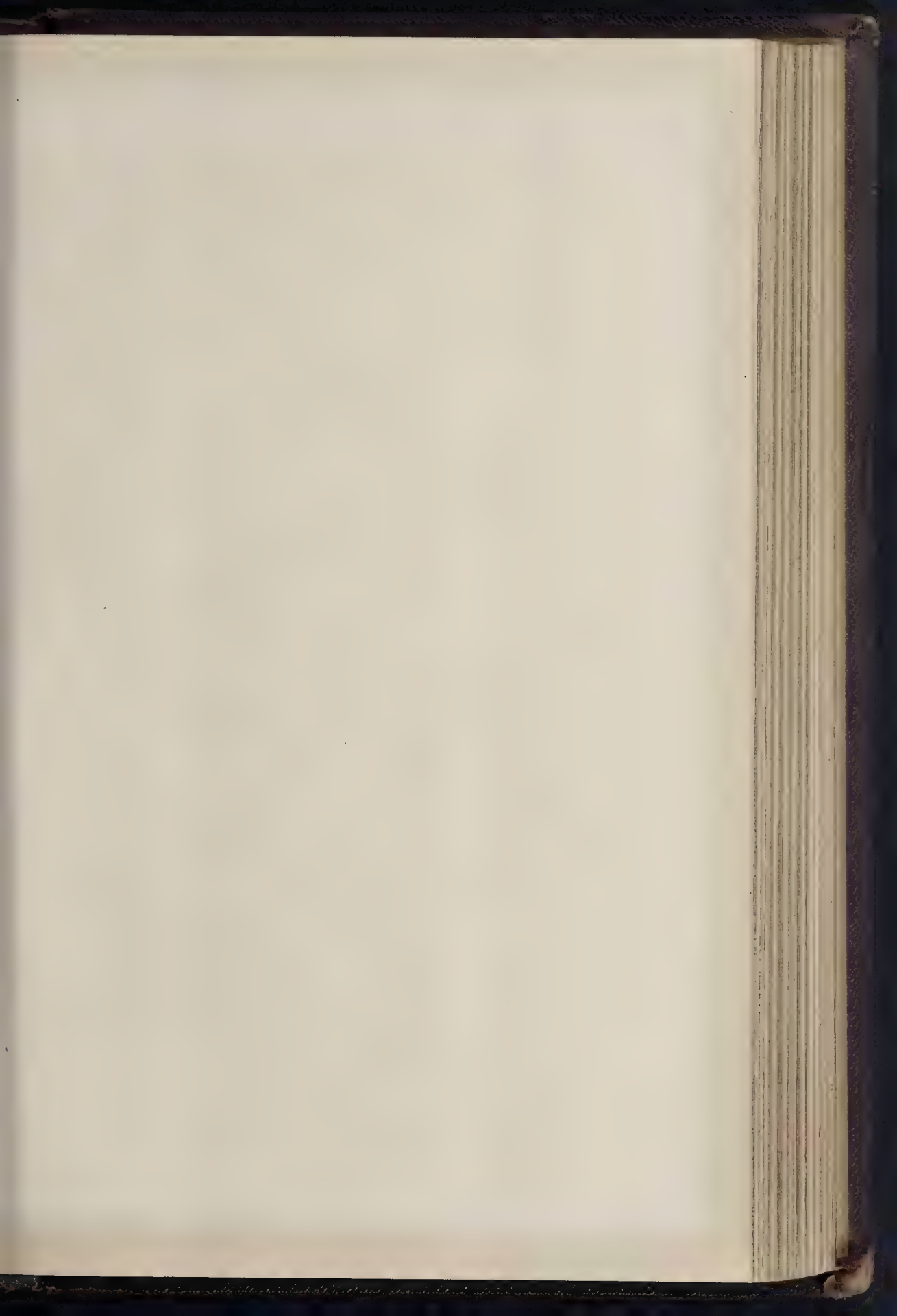


PHOTOGRAPHED BY SPENCER & CO. 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100, 102, 104, 106, 108, 110, 112, 114, 116, 118, 120, 122, 124, 126, 128, 130, 132, 134, 136, 138, 140, 142, 144, 146, 148, 150, 152, 154, 156, 158, 160, 162, 164, 166, 168, 170, 172, 174, 176, 178, 180, 182, 184, 186, 188, 190, 192, 194, 196, 198, 200, 202, 204, 206, 208, 210, 212, 214, 216, 218, 220, 222, 224, 226, 228, 230, 232, 234, 236, 238, 240, 242, 244, 246, 248, 250, 252, 254, 256, 258, 260, 262, 264, 266, 268, 270, 272, 274, 276, 278, 280, 282, 284, 286, 288, 290, 292, 294, 296, 298, 300, 302, 304, 306, 308, 310, 312, 314, 316, 318, 320, 322, 324, 326, 328, 330, 332, 334, 336, 338, 340, 342, 344, 346, 348, 350, 352, 354, 356, 358, 360, 362, 364, 366, 368, 370, 372, 374, 376, 378, 380, 382, 384, 386, 388, 390, 392, 394, 396, 398, 400, 402, 404, 406, 408, 410, 412, 414, 416, 418, 420, 422, 424, 426, 428, 430, 432, 434, 436, 438, 440, 442, 444, 446, 448, 450, 452, 454, 456, 458, 460, 462, 464, 466, 468, 470, 472, 474, 476, 478, 480, 482, 484, 486, 488, 490, 492, 494, 496, 498, 500, 502, 504, 506, 508, 510, 512, 514, 516, 518, 520, 522, 524, 526, 528, 530, 532, 534, 536, 538, 540, 542, 544, 546, 548, 550, 552, 554, 556, 558, 560, 562, 564, 566, 568, 570, 572, 574, 576, 578, 580, 582, 584, 586, 588, 590, 592, 594, 596, 598, 600, 602, 604, 606, 608, 610, 612, 614, 616, 618, 620, 622, 624, 626, 628, 630, 632, 634, 636, 638, 640, 642, 644, 646, 648, 650, 652, 654, 656, 658, 660, 662, 664, 666, 668, 670, 672, 674, 676, 678, 680, 682, 684, 686, 688, 690, 692, 694, 696, 698, 700, 702, 704, 706, 708, 710, 712, 714, 716, 718, 720, 722, 724, 726, 728, 730, 732, 734, 736, 738, 740, 742, 744, 746, 748, 750, 752, 754, 756, 758, 760, 762, 764, 766, 768, 770, 772, 774, 776, 778, 780, 782, 784, 786, 788, 790, 792, 794, 796, 798, 800, 802, 804, 806, 808, 810, 812, 814, 816, 818, 820, 822, 824, 826, 828, 830, 832, 834, 836, 838, 840, 842, 844, 846, 848, 850, 852, 854, 856, 858, 860, 862, 864, 866, 868, 870, 872, 874, 876, 878, 880, 882, 884, 886, 888, 890, 892, 894, 896, 898, 900, 902, 904, 906, 908, 910, 912, 914, 916, 918, 920, 922, 924, 926, 928, 930, 932, 934, 936, 938, 940, 942, 944, 946, 948, 950, 952, 954, 956, 958, 960, 962, 964, 966, 968, 970, 972, 974, 976, 978, 980, 982, 984, 986, 988, 990, 992, 994, 996, 998, 1000.

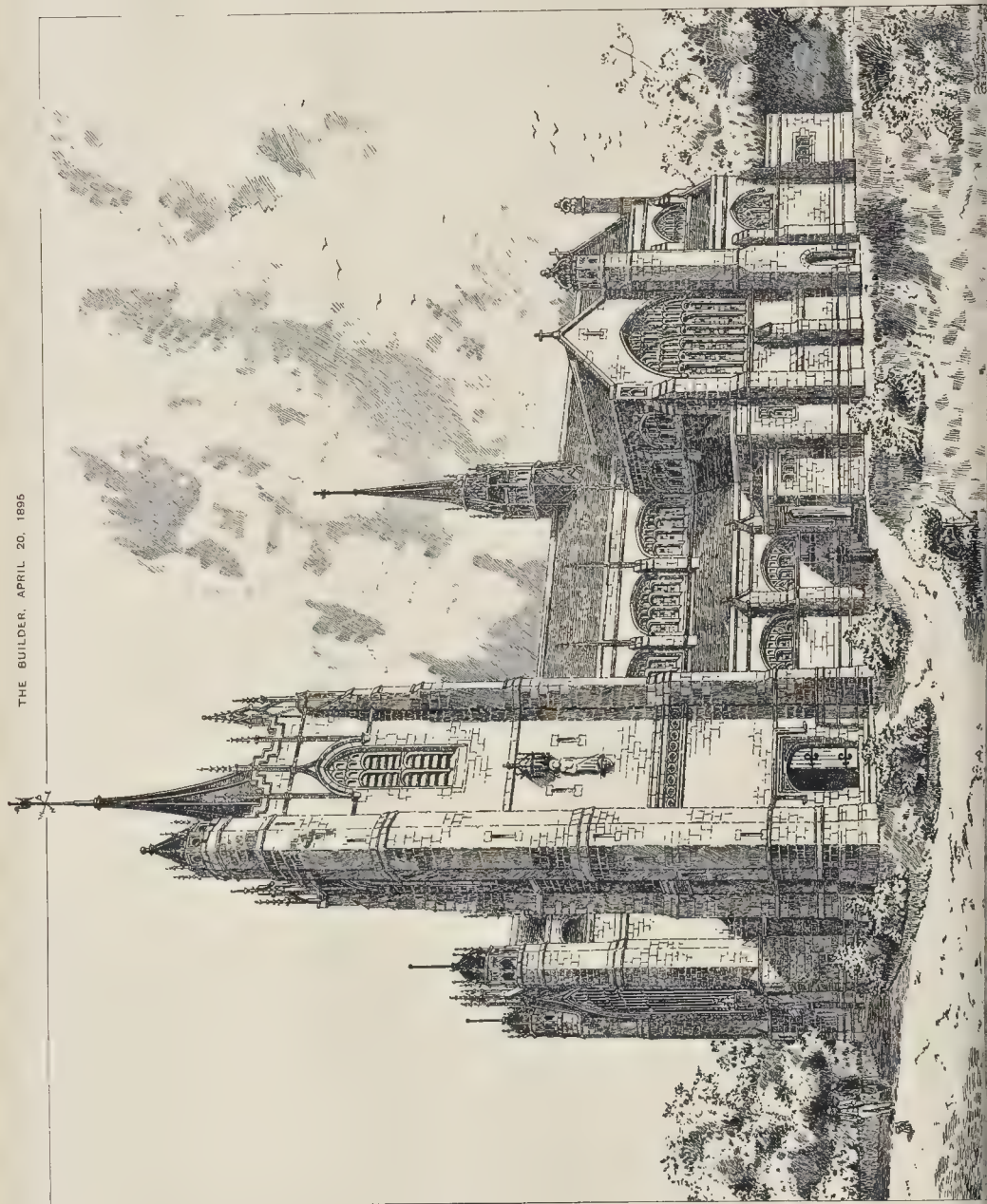


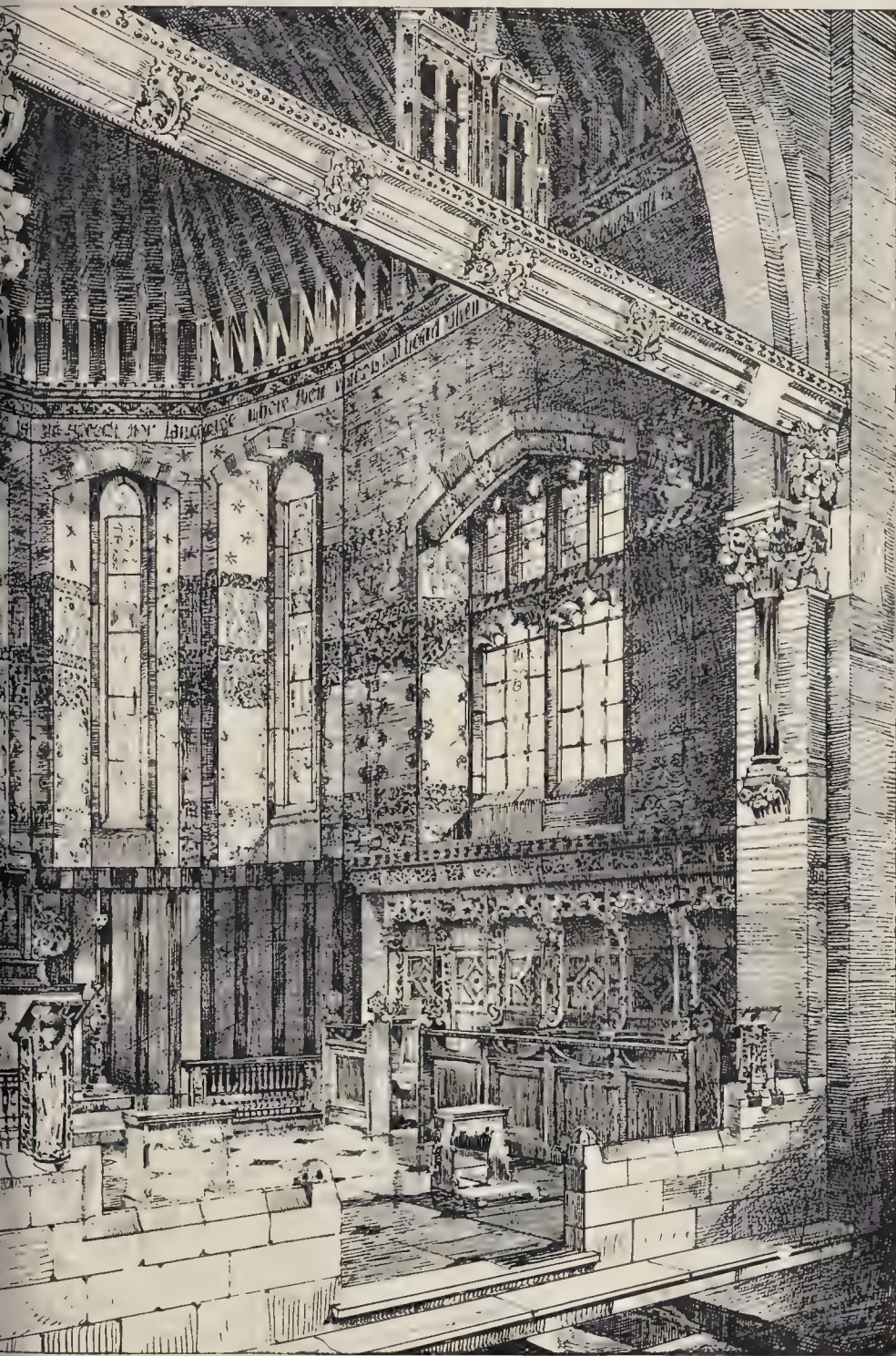
THE BUILDER. APRIL 20, 1895





THE BUILDER, APRIL 20, 1895

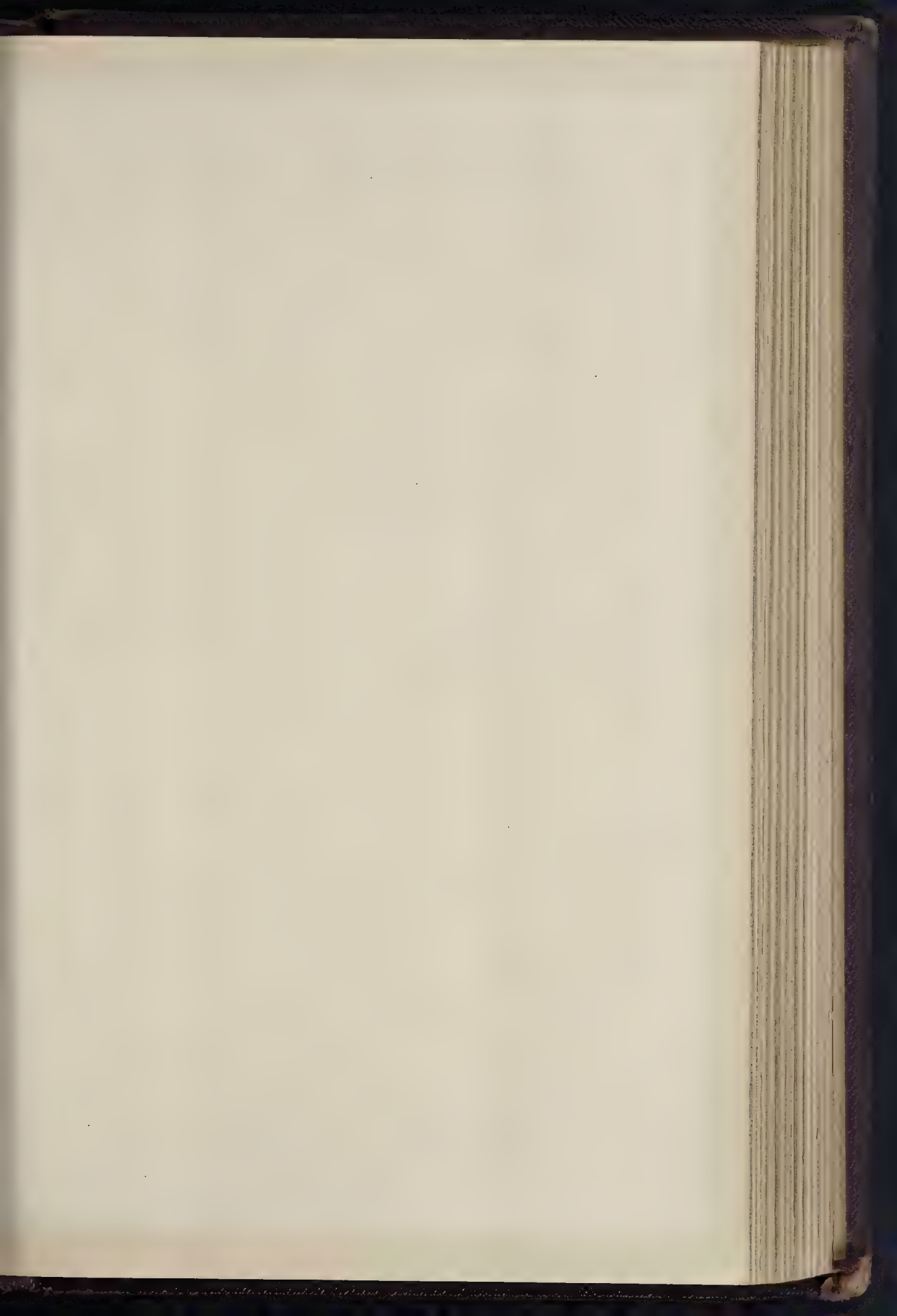




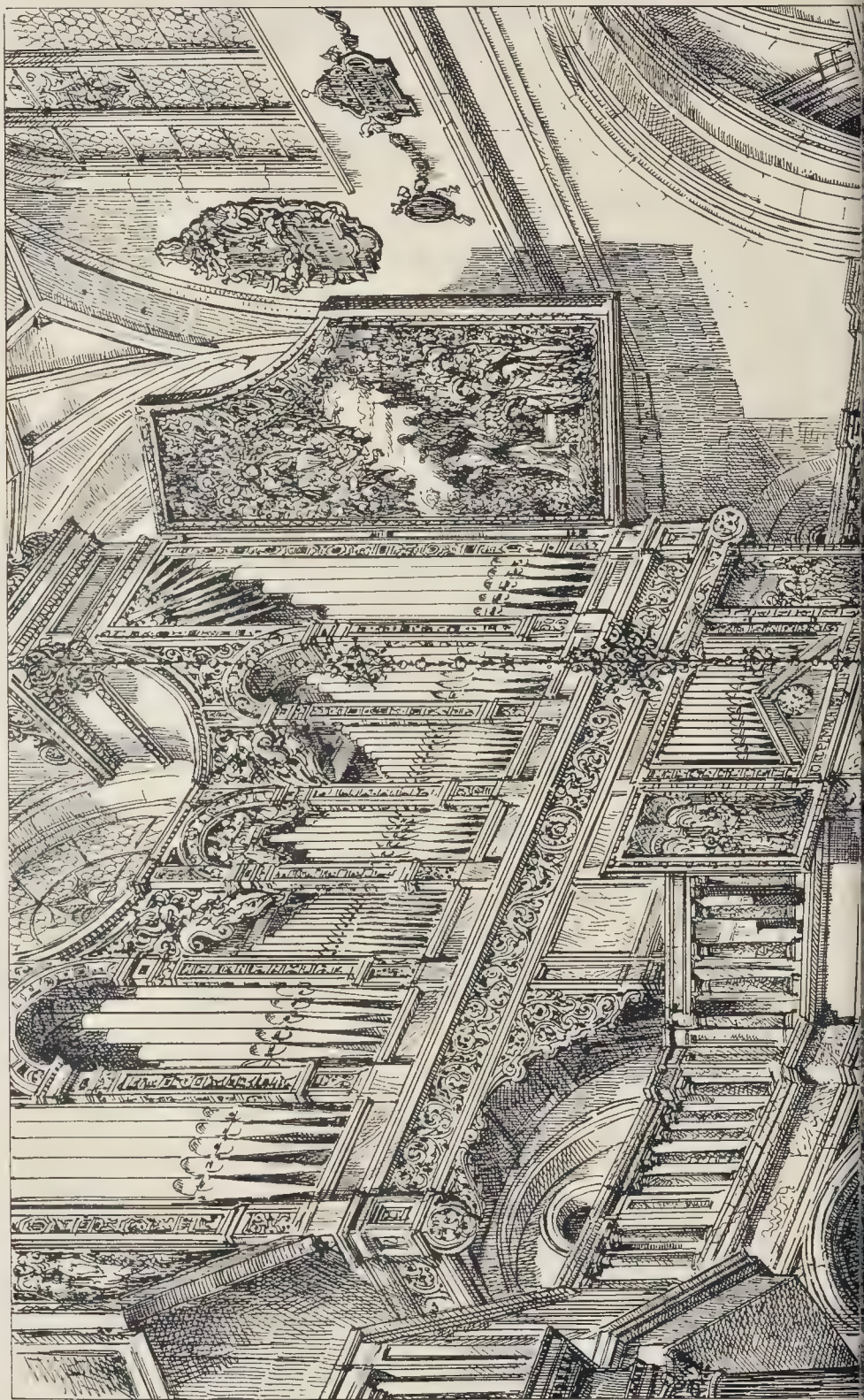
STALLS AND DECORATION TO CHURCH, PYE STREET, WESTMINSTER.—MR. JOHN BELCHER, F.R.I.B.A., ARCHITECT

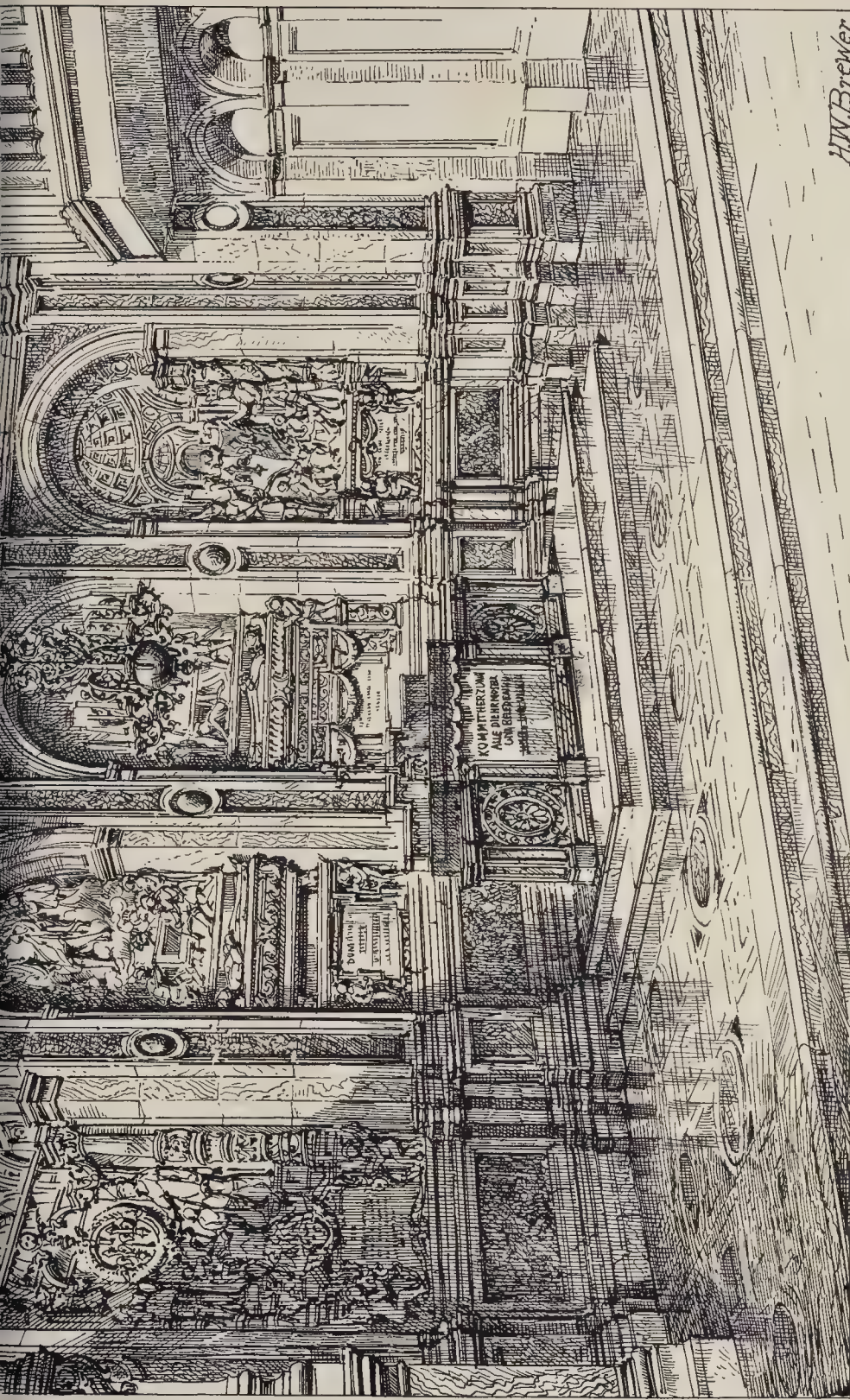


NEW HOUSE, SHARDON, NEAR MAYFIELD, SUSSEX SOUTH-EAST VIEW - MR H O CRESSWELL, A.R.I.B.A., ARCHITECT



THE BUILDER, APRIL 20, 1895

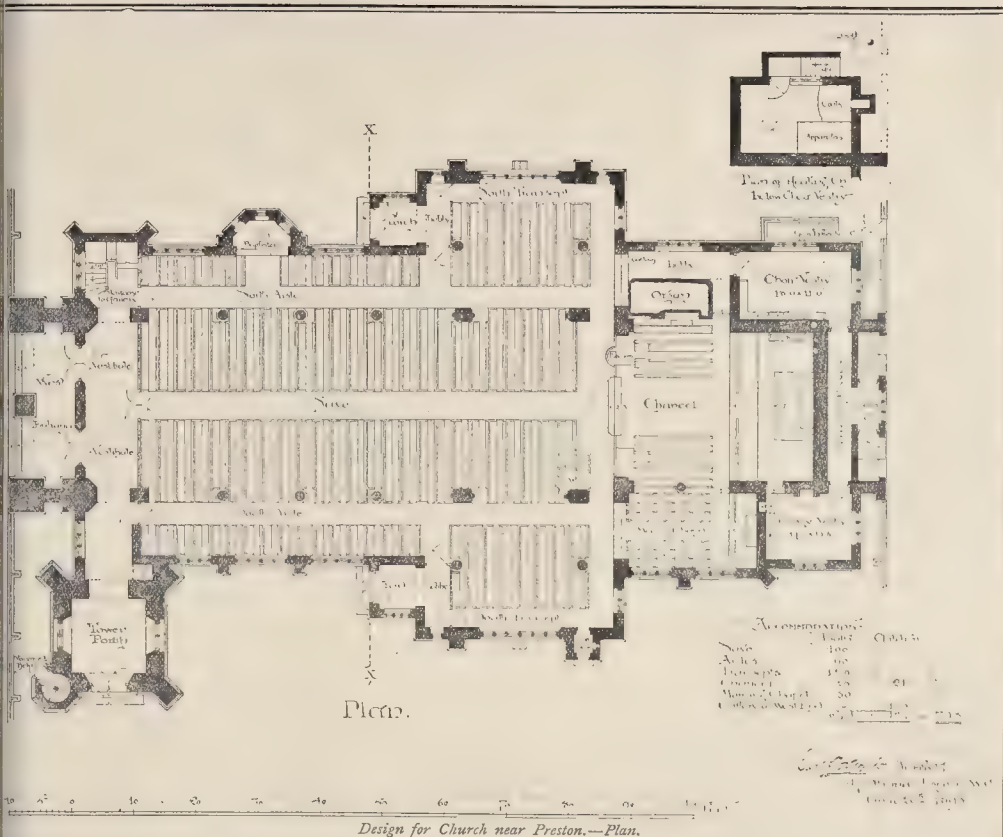




H.W. Brewer.

PHOTO LITHO SPRAGUE & CO. 413 EAST MADISON STREET, CHICAGO, ILL.

THE FUGGER CHAPEL, ST. ANNE'S, AUGSBURG.



Design for Church near Preston.—Plan.

een are said to be the work of "Candido," or Witte (the former being simply an Italianisation of the German "Witte"). Be this as it may, there can be no doubt whatever that the carvings are either by an Italian, or a man who had studied in Italy. A most curious proof of this is furnished by the fact that, the perspectives introduced into the side-niches, iron ties are represented at the springing the vaultings. Now, no German or Frenchman would ever have done this unless, as is the case with "Candido," he had received art training in Italy. We are unfortunately unable to find out for certain who it was that actually executed these fine works, nor are we sure whether the "Candido" referred to is the same man who executed some works at the old palace in Munich and at Landshut. There is a good deal of very interesting Early Renaissance work in Augsburg which is of a very different character than that generally found in Germany, and it looks though it were the work of Italians, or possibly Germans who had been brought up in Italy. It is known that "Candido" studied in Italy, and his works at Munich, and in Castle Transilvania, at Landshut, singularly enough, are less Italian in character than the Fugger monuments in Augsburg, and it has struck me that it is probable that just as there were three Holbeins and two Burgkmairers in Augsburg, there may have been two Candidos—if a Candido was really the sculptor of the work in the Fugger chapel.

Now we come to the singular fact that five years later than the Fugger Chapel another great and wealthy family in Augsburg, the Schnekins, were erecting at the church of SS. Afra and Ulrich, in the same city, a monumental chapel of the most opposite character—that is to say, a building in quite pure Gothic style, without any admixture of Renaissance—so that we have two wealthy families, one employing an architect to erect a purely Italian chapel, and another patronising an architect who was working in the pure Gothic style, just as we find things going on at the present day. The altar of the Schnekin chapel is dated 1517, and the chapel is over the sacristy, on the north side of the choir

of the church of SS. Afra and Ulrich. By rights we ought to specify that it is the "Catholic parish church of SS. Afra and Ulrich," because there is a Protestant parish church of the same dedication, which leads to considerable confusion in describing the churches, and even the indefatigable Kugler in his "Kunstgeschichte" indexes this very church incorrectly, naming it as *two distinct churches*, one dedicated to St. Afra and the other to St. Ulrich. There are certainly two churches, but both are dedicated to SS. Afra and Ulrich, and the only possible way of distinguishing them is to state to which religion the one in question belongs.* The (Catholic) parish church of SS. Afra and Ulrich is a very noble example of a third pointed tower church of grand dimensions, 318 ft. long, 94 ft. wide (over nave and aisles), and 100 ft. to the crown of the vaulting. The nave was commenced in 1476 by an architect named Hans Luitpold, but the choir was not begun until the year 1500, under the celebrated architect and sculptor, Burkost Engleberger, who also designed the aisles and pulpit of Ulm Cathedral. No doubt Engleberger's work included the Schnekin Chapel, which must have been very little later than the choir, but was completed earlier than the latter, which was not entirely finished until the close of the sixteenth century. The Schnekin Chapel, however, was certainly finished in 1517, as the beautiful altar bears that date. The reredos is a very fine work, carved in pine-wood, gilt and painted. The triptych is rather singular in arrangement, as the doors have very long hinges, so that the extreme outside statues and canopies are seen whether the doors are open or closed; in the former case they show between the hinges, and in the latter outside the doors. There is another feature which we have met with elsewhere, and that is the glazing of the little window-like piercings behind the figures and under the canopies. The saints represented are as follows, commencing at the top:—1, St. John the Baptist, to whom the chapel is dedicated; 2, St. John baptizing our

Lord; 3, 4, 5, and 6, Angels bearing emblems of the Passion; 7 (in centre), Madonna and Child; 8, St. Catherine; 9, St. Afra; 10, St. Ulrich; 11, St. Anthony; 12, St. Ulrich; 13, St. Rock; 14, St. Boniface. The pictures on the wings or doors represent the Annunciation, the Presentation, the Nativity, and the Judgment of Solomon; but these have unfortunately been so abominably retouched, some seventy or eighty years back, as to be ruined. The altar itself is perfectly plain, with a molded "mensa" and an arched perforation in the centre. The work is attributed, and I think correctly, to Tilman Riemenschneider, of Würzburg, as there are more than one singularity of treatment in common between this and Riemenschneider's altar at Rothenberg, in addition to which the figures, allowing for difference of material, greatly resemble those on the columns of the Marienkapelle at Würzburg, the tomb of St. Henry at Bamberg, and the monument of Bishop Scherenberg (illustrated in the *Builder* a few years back) in the Cathedral at Würzburg.

The entire absence of any kind of Classical ornament from the details of this altar is very singular when we consider its date, 1517, and the fact that the Fugger Chapel, which was certainly completed five years earlier, is quite as purely Renaissance and free from Gothic detail. These examples of two distinct styles of architecture being carried on at the same time serve to show that the present architectural practice can derive some countenance from that of the Middle Ages; and very likely if we knew all we should find that architect's patrons in the Middle Ages did not differ very much from those of the present day, and were just as full of whims and fancies. H. W. B.

CHRIST CHURCH, CHELTENHAM.

This church is a large building, erected rather more than fifty years ago, in the "Early English" style then prevalent, with very deep galleries and no chancel. In 1886 Professor J. H. Middleton was consulted as to improvements, and recommended that the style of the existing building should be ignored, and the whole remodelled on

* Baedeker speaks of a "Protestant and a Catholic Church, both dedicated to St. Ulrich," which is also incorrect.



Plan of House, Sharnden.

the lines of a Basilica. The scheme has been partly carried out, an apse having been built, and a long "Chorus cantorum," with oak stalls arranged in front of it. The apse has been decorated with important paintings. The roof and semi-dome are painted by Mr. W. B. Richmond, with figures of our Lord, the Apostles, St. Michael, St. George, &c., a very large and splendid work. The walls have panels of the Annunciation, Visitation, Nativity, and Presentation, and the retables a triptych of the Resurrection, all by Mr. J. Eadie Reid. The marble work is partly executed by Mr. H. H. Martyn, partly by Messrs. Boulton. The drawing is by Mr. Orlando Middleton.

HENRY PROTHERO.

DESIGN FOR A CHURCH NEAR PRESTON.

THIS design was submitted in open competition. The building was planned with a view to being carried out in sections according to the means at the disposal of the Building Committee, and when completed would have provided seating accommodation for about 700; the gallery over the west entrance and vestibule would have provided further seats for about 100 children. The exterior would have been in local stone, and the roof covered with Broseley tiles.

The drawing was exhibited in last year's Royal Academy. Messrs. Clark & Hutchinson are the authors.

DECORATION FOR CHURCH, PYE-STREET, WESTMINSTER.

THIS is a sketch design by Mr. John Belcher for oak stalls and painted decorations to the walls of the church referred to.

The drawing was exhibited in the last Royal Academy exhibition.

NEW HOUSE, SHARNDEN,* NEAR MAYFIELD, SUSSEX.

THIS house has been recently erected on a charming site for Mr. R. Gordon Shaw as a summer residence.

The materials are red Crowborough bricks for the walls, with bright red tiles to the roof, and the external woodwork is painted white. The terrace, as shown in the drawings, was at first intended to be executed in red brick similar to the house, but was slightly varied in execution owing

to its being carried out in local sandstone of a nice warm tint obtained on the property, and affording a pleasing variety of colour. As the house stands high, it commands magnificent views over the Weald of Sussex right away to the South Downs, and as it has the additional advantage of being on an old site, a portion of the gardens were already in existence, and the line of trees shown at the back of the house in Mr. Paul's drawings sheltering it on the north and east are not due to the fertile imagination of the artist, but are really there. Since the drawings were made, however, the ground immediately below the terrace on the south and east sides—shown as a field—has been laid out as additional pleasure grounds, very much improving the appearance of the place. The stables are situated a short distance from the house, and are entirely screened from it by thick belts of trees, and a small house which previously existed close to the entrance-gates has been converted into two cottages for the use of the gardener and coachman.

The whole of the building work was carried out by Messrs. Norman & Burt, of Burgess-hill; the sanitary plumbing and water supply being by Messrs. Dent & Hellyer. Mr. A. Sandall acted as clerk of works.

H. O. CRESSWELL.

Books.

A History of the Great Western Railway: being the Story of the Broad Gauge. By G. A. SEKON. London: Digby, Long, & Co. 1895.

THIS is, unfortunately, a badly-written book on a very interesting subject. It narrates the inception of the Great Western Railway with a pretty full account of the now ancient history of "the battle of the gauges," and continues the general history of the line and its working down to the day when the great operation of conversion of the whole line to narrow gauge was carried out with a speed and an absence of oversights or accidents which, however some of us may regret the occurrence itself, was one of the most creditable and remarkable operations in the whole history of the line. A great part of the interest of the book consists in the quotations from the reports of Brunel to the committee while the gauge question was still under discussion. Brunel's principal report, showing the advantages of a

wider gauge, and how much the ideas of cost involved in the construction had been exaggerated, is a remarkably shrewd and a piece of reasoning, and seems in the end unanswerable. It is characteristic of Brunel's determination and foresight in pushing his view that in the Bill for promoting the railway, he contrived to avoid all mention of the width of gauge, so that his Company might not have its hands tied.

The misfortune for the Great Western Company as the author mentions, was that the introduction of the broad-gauge came just too late. The narrow-gauge had sufficiently taken the lead to be regarded by many as the established gauge, and to have become incorporated with very large vested interests. Even in some of these circumstances it is possible that the broad-gauge might have held its own as the trunk-gauge for its district of England, and compelled the action of the same gauge for the minor lines directly connected with its system, had the line been worked with more enterprise than for many years it was; though, of course, the broad-gauge would always have had to come at some point. It was a great pity Brunel did not get his hand into the railway system of England at an earlier date; it would have been greatly to the advantage of English railway travelling.

Among the peculiarities in the construction of the line which were due to Brunel's original was that of keeping it all as nearly level as possible, and concentrating the changes of level at one or two points, where bank-engines would be required to assist the trains up special gradients. With the modern locomotive these gradients are surmountable without such assistance; in Brunel's time they were not, and the wisdom of his policy may be questioned; but from his point of view there is a good deal to be said for it. He was a line eminently adapted for fast travelling, which, with the engines of his day, a considerable number of gradients would have been a serious obstacle, while the cost of keeping up bank-engines at one or two points on a long line would not have been material.

The description of the manner in which the original Great Western roadway was constructed, which is given in detail, is of interest; though this we think does not do so much credit to Brunel's genius; it was complicated and very costly, and could not have succeeded after all in one of the great objects in railway building—distribution of the weight of a train over the largest base of ground—as well the cross-sleeper system. N

* Not "Shardon," as given on the plate; a mistake for which the inaccuracies of the R.A. catalogue are mainly responsible.

ple who use their eyes in travelling are
re that the Great Western rails were laid
longitudinal balks of timber, a consider-
length of which is still down, though we
erve that the cross-sleepers are being
dly substituted; but few are aware that these
e carried on vertical piles, which in the
ankments were of such a length that 6 ft. to
of them was to go into the original surface
he ground at the base of the embankment.
s was a most costly method, of course, as
piles were at intervals of every 15 ft. There
ention of cross-timbers under the longitudinal
s, but the account does not state at what
ervals these were placed. After the longi-
tinal timbers had been laid, a hard-wood
k 1½ in. thick and 8 in. wide was nailed on
with an upper surface sloping inwards
n angle of 1 in 20, and on this the rails were
ed. Altogether this seems a very compli-
d system, and after all did not present the
antage of the simple surface cross-sleeper
em, whereby the even weight of the train on
two ends of the sleepers in itself tends to
p them level under the pressure, and makes it
ly possible for one rail to dip independently
the other. That this kind of weakness
urred at an early period on the Great
stern Railway, when the ground was in a bad
e, is obvious from the history; not to speak of
endency of the longitudinal balks to dip at the
s as the weight went over them. One of the
st accidents that has happened on the Great
stern, when the "Flying Dutchman" left the
s a good many years ago, was probably due to
p in the sleeper when the ground was in a
state. In this respect, therefore, Brunel's
s was unscientific as well as costly. But in
ard to the gauge we hold that he showed a
instinct; only it came too late.

fr. Sekon's book contains some of the anec-
es characteristic of the early days of railways
ch are always interesting as enabling one to
ise the position when the whole system was a
tempt on its trial. One of the conditions
osed on the company was that they were to
d no station at Slough; this was on the
ving of the Eton authorities, who feared that
railway would demoralise the boys. There
s no condition, however, forbidding them to
b their trains at Slough, and they hired two
ns in a public-house close to the line, as
ting-rooms, and stopped and took up
engers whenever they pleased. The story at
Babbage going down on a special on the
line, on the assurance that no train was due,
coming near being smashed by Brunel
ping up the line unexpectedly driving his own
line, is a still better illustration of the light-
rtness of early railway arrangements: we
refer the reader to the book, where it is told
n Babbage's own words.

he book contains a good deal of information;
ails only in a literary sense, and might have
n made much more interesting reading than

se two books maintain their value, and come
with added chapters, mainly on the subject
lectric works. Of the two it may be said that
on's is more an architect's book, Laxton's a
nder's book, going more into detail as to
ing and details of work. The new informa-
n in Laxton appears fuller, and, in fact, the
book is more bulky than Spon's, and, hap-
s, not so methodically arranged. The new
nding Building Act is printed in full in it, as
old was in former editions. Spon does not
ude this, the compiler, perhaps, rightly think-
that architects are certain to have the Act in
er forms, and it would but add to the volume
cost of the book. The alphabetical arrange-
nt is maintained, by which the process of turn-
nt to what one wants is much facilitated. Of
two we prefer Spon, but then we write from
point of view of the architect. Probably
xton is the more useful one to contractors,
ays allowing for the fact that prices are taken
a rather high rate, and must be taken cum
no where competition is close or where the
work is not contemplated.

n regard to one point in Spon, we have before
d why the Greek Doric is not included in
diagrams and descriptions of the Orders. If
Ionic may be taken as in the main similar
ether under the head of Greek or Roman, this

is not so with the Doric. No one, perhaps,
would go to a price-book for the proportions and
details of the Classic orders; but if they are
included at all, it is behind the times not to
include the true Doric order.

Correspondence.

To the Editor of THE BUILDER.

THIN PARTITIONS.

SIR,—In criticising the manufactures of "The
Fireproof Construction Company" you refer to the
advantages of a 3-in. plastered partition, but (so far
as this desideratum goes) there is no need for any
patent or expensive construction whatever. I know
one place at least (the Canaries) where 2-in.
brick walls are a matter of everyday usage for
partitions which are not required to carry weight.
These are built of solid brick in quick-setting stuff,
and when plastered both sides the total thickness is
only 7 centimetres. There is probably not an
hotel in the Canary Islands, large or small, in which
this work does not occur, and I never heard of
failure.

Referring to a schedule of prices, I find the price
per square metre of "Fabrique de ladrillo de
0.05 m. con dos paramentos enlucidos" is
3.20 pesetas (zs. 8d.), and a Spanish "maestro"
can build his wall to-day, plaster it to-morrow, and
distemper it the next day, with a minimum of fuss
and dirt. He can also build it to be self-supporting
between the ends if need be.

There is no reason why such work should not be
done here, unless it be that nothing short of a patent
will convince the British public.

If a more detailed description of the materials
and *modus operandi* would be of interest I shall be
pleased to give it. NORMAN WRIGHT.

PRINCE'S COURT.

SIR,—In a "Note" of March 16, (page 199 *ante*)
you mention that John Wilkes is stated to have
lived in Prince's-court, Westminster, in 1788. A
few days ago I saw a holograph letter written by the
Chevalier D'Eon, in 1791, and addressed to "Miss
Wilkes, Princess [sic] Court, Westminster." Wilkes
married in 1749; his daughter Mary died at her
house in Grosvenor-square, on March 3, 1802.

W. E. D.-M.

The Student's Column.

BRICKS AND TERRA-COTTA.—XVI.

EFFLORESCENCE (continued).

BURNING now to incrustations due to
purely chemical causes, it may be re-
marked that they rarely present the
same character in any two bricks made of different
earths. It frequently happens that the brick
manufacturer is also a producer of whiting, lime,
cement, &c., and the by-products resulting there-
from are freely used with the raw earths in
preparing them for even high-class bricks. In
most instances it happens that the brick-maker
has not the faintest conception of the chemical
and metallurgical effects of the earths used. He
leaves that to an "intelligent" foreman, who, by
dint of long experience, and continual shifting
from one brickyard to another, is possessed of
many "secrets." We mention this as it will
account for the divers manners in which bricks
from one yard produce chemical incrustations,
which vary in character when traced over a long
period.

The incrustation is frequently developed before
the bricks leave the kiln; as this may seem some-
what incredible in view of the generally accepted
ideas in reference to the cause of "efflorescence,"
it may be stated that this has come under our
own eyes in no less than eight yards visited, or
we should have hesitated to mention the circum-
stance. In three cases it was found to occur in
the kiln within seven days after the bricks were
commenced to be "drawn"; in the remaining
five instances the bricks were in for periods
varying from a week to three weeks. We are
in a position to state also that in at least
four of the cases mentioned no rain or wet
could have been instrumental in bringing out
the incrustation, inasmuch as the kilns were
practically closed, whilst in two other instances
they were partially muffled. We are very
loath at this stage of our inquiry—to promul-
gate any theory in reference to incrustations
formed in the kiln (which, by the way, become
much more manifest when the bricks are exposed

* "Brick wall 5 centimetres thick with (and including)
both sides plastered."

to the atmosphere for a short time), but we are
under the impression that the particular class of
fuel used is largely responsible therefor. Our
researches on this matter are, unfortunately,
rather limited in extent at present, but the actual
chemical nature of the efflorescence, so far as we
have examined it, frequently presents certain
elements not present in the raw brick before the
latter is burnt. On the other hand, we find these
additional chemical constituents in the fuel used,
and it is only natural to suppose that that is their
source of origin.

The incrustation in ordinary bricks is often
alluded to as "salting." We have not the
slightest objection to this if the term be
used in a chemical sense, for it is often found
to be a salt of some kind; but we know that
most people imagine that the white coating
is common salt (chloride of sodium), and
that compound is rarely involved in its
formation. Some years ago, quite an animated
discussion took place in our columns with refer-
ence to the "efflorescence" of bricks at Swansea;
and it was seriously stated (although we did not
endorse the statement), that it was due to the use
of sea-sand in the manufacture of the bricks, it
being assumed that the incrustations were merely
exudations of sea-salt. From what we have said
on previous occasions in this series of articles, it
will be readily understood that with an excess of
chloride of sodium in a brick-earth, or even a
moderate amount of it, it would be impossible to
burn the material into a brick at all, as it would
promptly cause the earth to "run" long before
sufficient heat had been applied to thoroughly
burn it. It is absurd, therefore, to suggest that
incrustations on bricks can be altogether due to
common salt brought out by percolating moisture.

This leads us to observe that in all the brick-
yards we have visited, save two, the responsible
persons in charge of the burning process dis-
tinctly believed that bricks were melted according
as it was possible to get up to a certain high
temperature. In other words they thought that,
given a brick-earth of any kind, it would be fused
on arriving at that temperature; and the kilns
were fired accordingly. We recommend this
matter to the notice of "Technical Education"
Committees.

The taste of an incrustation may be saline
(though not due to common salt), acidulated, or
alkaline. When of chemical origin it is in
most cases soluble, and wears off by the action
of rain and wind; but often reappears after a
time. This saline effect is produced through a
chemical affinity which subsists between the
acids in the atmosphere, and the acids and
alkali contained in the lime and magnesia in
the bricks, as well as in the mortar or cement.
The effects are materially aggravated when chalk
is used to an inordinate extent. Special impor-
tance, therefore, should be attached to the dis-
covery in bricks of soluble salts which lead to
the incrustation. As the complete absence of
these is hardly to be looked for, a certain num-
ber of experiments would define a limit which
should not be exceeded. This limit would be
fixed after consideration of the relative effects of
different salts in various quantitative proportions.
The question of saline crystallisation is, however,
less easily treated, as in this instance the active
cause not only forms an integral part of the
brick, but may to some extent, be composed
of salts which are introduced whilst the brick
is in position. This condition is usually found
in connexion with embankments, sewers, &c.,
in which cases the brickwork is exposed to
various influences especially calculated
to produce the effects in question. When
derived from the substance of the brick itself
there can be no doubt that the material is
decomposed during the process. A particular
test in connexion with saline incrustation can
hardly be established at present, but in any case
its effects from the point of view of decomposition
would be less marked than those of frost.

Mr. Wm. Trautwine, an American author
who has probably investigated the cause of the
efflorescence of bricks in greater detail than any
other observer, notes that, although in some
instances it can be shown that the mortar is
responsible for the mischief, it is equally clear
that in others it is due to the composition of the
bricks themselves. He remarks that, occasion-
ally, the coating is tinted yellow, possibly
from traces of oxide of iron, or hyposulphite
of lime. A brick of this description taken
haphazard was examined somewhat in detail.
Its coating had a peculiar taste, due to sulphate
of magnesia, and in order to ascertain whether
this existed also in the interior of the brick, the
latter was crushed, and placed in water. At the

end of a week the water had dissolved out a mixture, consisting mainly of the sulphates of magnesia, lime and iron. This brick contained no traces of sulphites, soluble carbonates, or soluble chlorides. Many other incrustations examined were composed almost wholly of sulphate of lime and magnesia, with traces of iron and alumina; no carbonates were present.

As many persons yet believe that efflorescence is primarily due to percolating moisture (as, indeed, it is in some instances), it may be well to note that sulphate of magnesia possesses the peculiar property of "blossoming" in dry air. Bricks which, apparently, contain more than their full share of the sulphates of magnesia and lime, become much whiter in dry weather than others around them not thus constituted. Seeing that these sulphates are mainly due to the volatilisation of iron pyrites in the coal used in burning (though, perhaps, indirectly), the easiest way to get rid of them is either to use a better quality coal, or to entirely muffle the kiln. The latter, from other reasons, connected with brittleness, could not be adopted universally. It must be remembered, however, that similar effects may be wrought in the atmosphere of a manufacturing town, due to the combustion of coal. Nevertheless, the small amount of sulphuric acid diffused in the air is insufficient to produce any effect until after long exposure, unless in very exceptional circumstances, and seeing that new bricks are more rapidly incrustated than old we must yet seek further and, it may be, concomitant causes. Of course, silicates of lime and magnesia in semi-vitrified bricks are somewhat protected from the action of the air.

In those parts of the country where lime is made from dolomite, the incrustation is unquestionably due to the decomposition of mortar compounded of that. Dolomite, typically, is composed about half of carbonate of lime and half carbonate of magnesia, and this, when treated and made into mortar, is very susceptible of the influence of sulphurous fumes. As the sulphate of magnesia dissolves and effloresces, the mortar is disintegrated, and spreads its influence to the neighbouring brick. To avoid this defacement, lime free from magnesia should be employed in the mortar.

It is commonly believed that incrustations on bricks may be prevented by using Portland cement instead of mortar; but this pre-supposes two things—viz., that the white coatings are due entirely to the influence of the mortar, which is by no means the case; and secondly, that the cement contains merely a small proportion of magnesia. As a matter of fact, the quantity of the latter in a Portland cement is very variable, depending on the kind of cement. In a fairly good one it is reasonable to expect but a very small amount, when it becomes involved with the argillaceous constituent, and is no doubt protected by the latter to a certain extent. Given the same brick, it would seem that it effloresces more briskly when set in the average mortar than in average quality Portland cement, that is, within limits, and in certain conditions of the atmosphere.

Under the microscope, chemical incrustations present a variety of features into which it is not our purpose at the moment to enter. The vast majority of them are distinctly crystalline, and exist as aggregates of small crystals. These are usually as white as snow, but on certain varieties of bricks they are yellow, red, purple, and green. The crystals, moreover, appertain to several varieties of minerals, though genetic relationships can often be traced between them. In the flame of the blowpipe, in presence of suitable reagents, the existence of iron, calcium, aluminium, &c., may be proved.

We have indicated two or three means of mitigating the causes which lead to this disfigurement; on the whole, the more thoroughly vitrified the brick is the less likelihood is there of its efflorescing—white coatings on Staffordshire blue bricks, for example, are rarely seen. The same may be said where any good brick-earth is thoroughly fired, from which it will be understood that bricks prone to much efflorescence are either not made of suitable earths in the first place, or are not sufficiently burnt. At the same time, a comparatively poor earth in this respect may be neutralised by the employment of fuel containing iron pyrites in the smallest possible quantity, and by the adoption of partially muffled kilns. To carry out these suggestions, however, would be to raise the price of ordinary building bricks all round, and from the commercial point of view this is impracticable. It is not too much to expect, though, that the better kinds of bricks shall be so manufactured as to do

away with the possibility of incrustations; at the present time many of these are as bad as the poorer kinds. Indeed, we go so far as to say that the average London stock brick does not incur to anything like the same extent as do many red-brubbers and bricks made from the point of view of colouration only.

Other things being equal, bricks no doubt effloresce in proportion as they are porous. Thus it is that unsightly incrustations of a permanent character have been removed, and prevented from re-forming for many years by the application of linseed oil well rubbed into the face of the brickwork. That this is successful is beyond question, for one may obtain two bricks of precisely similar kinds from one maker, and after having oiled one of them and placed both out in the open for a few weeks, if any incrustation appears it will be upon that one which has not been treated.

OBITUARY.

MR. GORDON MACDONALD HILLS.—We record the death of this architect, an old member of the profession, who held an honourable though unostentatious position in it. Mr. Hills was articled to a firm of architects at Southampton, subsequently became assistant to Mr. Butler, cathedral architect at Chichester, his connexion with which cathedral lasted all his life. He subsequently set up in practice for himself in London, being chiefly employed in ecclesiastical work, and building a good many churches in different parts of England. He held the appointment of Diocesan Surveyor in the dioceses of London, Rochester, and St. Albans; was elected an Associate of the Institute of Architects in 1858, and was for some years Treasurer of the British Archaeological Society, and took a considerable part in their congresses. He was much engaged in antiquarian research, and wrote on Irish Round Towers, acoustic vases, monastic remains, &c. He had been engaged in preparing for publication the results of many years of research in regard to Chichester Cathedral, to which he had been for a long time architect, and the restoration of which he was shortly to have carried out. His death, which took place on the 5th, was attributed to a great extent to overwork; for the last eighteen months he had been obliged to leave active work to his son and partner.

GENERAL BUILDING NEWS.

CONGREGATIONAL CHURCH, NEW SWINDON.—On the 3rd inst. the new Congregational church in New Swindon was opened. The new building has been erected by Messrs. W. Jones & Sons, of Gloucester, from designs prepared by Mr. B. Silcock, B.Sc., Bath. The building, which affords sitting accommodation for about 550 persons, consists of a nave and side aisles, separated by arcading supporting a low clearstory. The building is entered from porches on either side of the main front, and access may also be had from a third porch at the back. The whole of the work is carried out in local brickwork with Bath stone dressings. A feature of the exterior is the brick tower, finished with ornamental coping and surmounted by a turret consisting of eight oak columns supporting the roof, which is covered with sheet copper; at the four angles of the roof are placed four flying dragons, executed in beaten copper and wrought-iron work. The central gable is enriched with pilasters, ball finials, carved apex stone, &c.; and is pierced with a rose window above the moulded strings, and below with a long mullioned window. Over the entrance to the low porch is a moulded and carved stone canopy supported with sculptured angel figures. The sides of the interior consist of low aisle walls pierced with mullioned windows, the intervening spaces being occupied with brick buttresses, with stone caps; the aisles are roofed over at a low level, and immediately above these rise the clearstories. The interior is lighted by means of the western rose window and low mullioned windows in the aisles and transepts, and in addition by the traceried clearstories. All the windows are filled with stained glass made by Mr. Swaine-Bourne, of Birmingham. The choir-gallery is placed in the apsidal termination of the nave, and is separated from the main body of the church by a wide moulded and carved arch. The gallery front and the rostrum immediately below are constructed of polished oak. A gallery is also provided at the west end, approached by a staircase in the tower. The ornamental gas-fittings, as also the whole of the wrought-ironwork, including the dragon terminals, have been executed by Messrs. Mariner, West, & Tylee, of Bath, from the designs of the architect. The stone carving and the sculpture were entrusted to the firm of Messrs. Harry Hems & Sons, of Exeter. The seating is carried out in Canadian oak by Messrs. Bennet & Co., of Glasgow.

ALMSHOUSES, HAMPTON-ON-THAMES.—On the 2nd inst. new almshouses were opened at Hampton. The building is adjacent to the railway station, is one story high, and comprises six separate dwellings, each consisting of a living-room, bed-room, scullery, offices, &c. Two of these dwellings are so arranged

that they can be subdivided if necessary, so that the building contains a maximum of eight separate dwellings. The structure has three fronts, in the centre of each being a double porch forming the entrance to two dwellings. The lower part is faced with red brickwork, and the gables and upper part is rough-cast work in white stone. Over each porch is a Jubilee Almshouses, 1887, set out in cement letters. The upper portions of the windows are lead-glazed with cathedral tint glass, and the roof is covered with alternate bands of plain and ornamental Broseley tiles of different shades. The architect was Mr. John Kemp, Surveyor to the Hampton District Council, and the builder was Mr. Robert Richardson, of Hampton Hill.

LIBERAL CLUB, OSSETT.—On the 10th inst. Lord Ribblesdale opened the new club house which the Liberals of Ossett have acquired. The building is situated in Station-road. Mr. W. A. Kendall, of Ossett, was the architect, and the building contract was executed by Messrs. Oldroyd & Sons, of Ossett. HOSPITAL, CLACKMANNAN.—The Combination Hospital for the County of Clackmannan, situated near New Sauchie, Alloa, was opened on the 1st inst. The buildings are from plans by Messrs. John Melvin & Son. There is an administrative block, also male and female wards, 18 ft. by 14 ft. There are likewise two pavilions, male and female wards, having accommodation for six beds each.

MISSION HALL, GRANGETOWN, GLAMORGANSHIRE.—A new mission hall is being erected at Grangetown, from the designs of Messrs. Habershon & Fawcett, architects. The building, which will accommodate between 1,200 and 1,400 people, will cost about £2,500, and is composed of red brick with Bath stone dressings. The hall is situated in the corner of Corporation-road. Messrs. Knox Wills are the builders.

AUCTION MART, THORNTON, N.B.—The new auction mart erected by John Swan & Sons, Limited, in close proximity to Thornton Junction, Fife, was opened on the 10th inst. The mart has been built by Mr. Alexander Waddell, Burntisland, from plans prepared by Mr. Storror, architect, Cupar. It has a frontage of 80 ft. by 40 ft.

REOPENING OF DEWENBURY PARISH CHURCH.—The reopening of this church, the history of which dates back from Saxon times, took place on the 14th inst. A few years ago, says the *Leicester Mercury*, about 19,000*l.* was laid out on rebuilding and enlarging the chancel, vestry and porches, and in the addition of transepts, the whole from the designs of Mr. G. E. Street, and now the south aisle has been entirely reconstructed. New windows have been placed in the clearstory, the nave, the roof of which has undergone rebuilding, and repairs have been effected in other parts of the edifice. The amount now expended, £4,350*l.* The north aisle has yet to be pulled down and made to harmonise with the rest of the structure. Before the parish church can be complete the tower will require rebuilding, or at least raising, the lights inserting, and the addition of another storey to the height at present being under 100 ft. The architect for the recent restoration is Mr. Street, London, and the contractors Messrs. Wilcock, Wolverhampton.

PRIMITIVE METHODIST CHAPEL AT ROTHERHAM.—A new Primitive Methodist chapel, which has been erected at Mashborough (Rotherham), was opened on the 15th inst. The new sanctuary, which cost about 2,300*l.* In connexion with the scheme a school. The chapel is built of brick, with stone dressings, and covered with Welsh slates. The design is English Renaissance, and accommodation is provided for about 700 people. The architect was Mr. Thomas Howdill and Mr. Charles Howdill, of Leeds.

REOPENING OF CARNON DOWNS WESLEYAN CHAPEL, CORNWALL.—This building has just been reopened after alterations and improvements. Mr. Swift, of Truro, was the architect, the carpenter being done by Mr. W. H. Moyle, the carpenter and the masonry by Messrs. T. Woolcock & Co., of Feock.

SANITARY AND ENGINEERING NEWS.

SEWAGE SCHEMES, CONISBOROUGH AND DENABY, YORKSHIRE.—On the 4th inst. Mr. General H. D. Croft, R.E., Inspector of the Local Government Board, held an inquiry concerning an application to borrow 1,798*l.* for the completion of a scheme of sewage and sewage disposal for the parishes of Conisborough and Denaby. Mr. G. White, C.E., explained the scheme. A sum of 8,800*l.* was originally borrowed, but was found inadequate. The Bolton-on-Deane and Goldthorpe parishioners, at a meeting on the 1st inst., adopted a sewage scheme for the abutments, as prepared by Mr. G. White, C.E., of Conisborough, and as approved by the Doncaster R.D. District Council.

STAINED GLASS AND DECORATIVE.

WINDOW, PARISH CHURCH, HARROW-ON-THAMES.—A bright stained and painted memorial window was placed last week in the north transept of this church. The subjects represented are "David," "St. Luke," and "Miriam." The

Of 387,907 making returns, 25,146 (or 6·5 per cent.) are reported as unemployed at the end of March, compared with 7·9 per cent. in February, and 6·5 per cent. in the forty-five Unions making returns for March, 1894. The building trades have resumed active operations, and the percentage of unemployed in Unions making returns has fallen from 10·1 to 4·9, compared with 3·5 per cent. in March, 1893. Nearly all branches of the furnishing and wood-working trades have improved during the month, with the result that the percentage of unemployed has fallen from 7·0 to 4·7, which compares with 4·2 per cent. in the corresponding month of last year. Eleven disputes took place in the building trades

APRIL 5. By *John Davies*: 7 and 9, River
rd., Highbury, u.t. 75 yrs., g.r. 707, r. 261, 680
Tollington-rd., Holloway, u.t. 54 yrs., g.r. 61, 581
380, Cantlowes-rd., Camden-sq., u.t. 68 yrs., g.r. 96,
350, 199, Elm-grove, Cricklewood, u.t. 84 yrs., g.r.
r. 291, 2701; 30, Vardens-rd., Wandsworth,
1 401, 2 and 5, Brookdale-rd., Catford, f.r. 512;
By *Reynolds & Eason*: 143 and 145, Great Cambridg
Hackney, f.r. 1101; 6 to 30 even, Angrove-st., H
ston, u.t. 61 yrs., g.r. 781, 2551; 61 and 60 Angrove

Horse, per hour	0 7	Watering streets
* Cleansing Contract, Ashpits, &c.		
awford	£500	David Kerr, junr., Goose-
Vallance & Son	470	berry Hall*
		£44

SEBASTIAN, for the erection of a new building, in a room, near Newmarket, Mr. H. H. Medley, of the City of London, is the architect. The building is to be of brick, with a tiled roof, and is to be used as a residence. The estimated cost is £1,000. The building is to be completed by the end of the year.

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We are compelled to decline pointing out books and giving addresses. The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors. Letters or communications (being new items) which have been duplicated for other journals are NOT DESIRED. All communications, relating to letters and artistic matters should be addressed to THE EDITOR, those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

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Registered Telegraphic Address, "THE BUILDER," LONDON.

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Each additional line (about ten words) 6d.
Terms for series of Trade advertisements, also for Special Advertisements on front page, Competitions, Contracts, Sales by Auction, &c., may be obtained on application to the Publisher.
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Four Lines (about thirty words) or under 4s. 6d.
Each additional line (about ten words) 6d.
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Stamps must not be sent, but all small sums should be remitted by Cash in Registered Letter or by Postal Order, payable to DOUGLAS FOURDRINER, and addressed to the Publisher of "THE BUILDER," No. 45, Catherine-street, W.C.
Advertisements for the current week's issue are received up to THREE o'clock p.m. on THURSDAY, but "Classification" is impossible in the case of any which may reach the Office after HALF-PAST ONE p.m. on that day. Those intended for the front page should be in by TWELVE noon on WEDNESDAY.

SPECIAL-ALTERATIONS IN STANDING ADVERTISEMENTS OR ORDERS TO WEDNESDAY MORNING.
The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c., left at the Office in reply to advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.
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AN EDITION Printed on THIN PAPER, for FOREIGN AND COLONIAL CIRCULATION, is issued every week.

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J. J. ETRIDGE, Jr.
SLATE MERCHANT,
SLATER AND TILER.

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To be Executed by Contract in any part of ENGLAND.
Penrhyn - Bangor,
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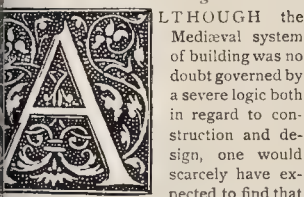
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"Rational Building."



ALTHOUGH the Medieval system of building was no doubt governed by a severe logic both in regard to construction and design, one would scarcely have expected to find that title "Rational Building" covered nothing more than a translation of the article "Construction" in Viollet-le-Duc's "Dictionnaire,"* that work the title "Construction" actually defined the scope of the article, inasmuch as the Dictionary was one of Gothic architecture only; Viollet-le-Duc's reasoning something like the celebrated definition of religion," which was found to be only her name for the Church of England. Viollet-le-Duc seems to argue, "When I say architecture, I mean French architecture; when I say French architecture I mean Gothic architecture"; and bearing this in mind, the article "Construction" is the construction adopted in French. If the article were published separately, the title "Construction" would much too large for the subject. The American translator, not content with that, has adopted a still more comprehensive title; and asks us to use the term "Rational building" to the end of construction adopted in one way during a period of two or three centuries. The frame is a great deal too large for the picture, and suggests something different from the actual contents of the book; though it forms, no doubt, a good catch the eye in a publisher's list. Mr. Huss tells in his preface that when free use of the information contained in the article "Construction" while making drawings for a large Cathedral in New York, the idea occurred to him of translating the article. The use said to have been made of the article is, like the article itself, rather *passé*, though not quite the same sense. The use of an analysis of the method of constructing French

churches in the twelfth and thirteenth centuries as an aid to building an American church in the nineteenth century, hardly seems like the path to "rational" architecture. The essay itself is *passé* for architects, in the sense that we know it all now; it seems like a series of elaborate proofs of facts that every mature student of architecture is familiar with; and, therefore, for architects, it is hardly worth while at this time of day to translate it into English. Non-professional readers, on the other hand, will neither understand nor care for it. The persons to whom it will be of service are students, in the more limited sense of the word; young persons in training as architects, who want a good study-book for the processes of Medieval construction, who may not read French easily, and who in any case can only get the "Dictionnaire" in a library. For these the translation will be a boon, and it may well take its place as a recognised text-book of the subject; the illustrations also give it a certain permanent value for more experienced readers, though we must say that we think Viollet-le-Duc's illustrations must be taken with a good many grains of salt, and that he was rather prone to arrange them as he wanted them, a weakness in which he was certainly not alone among French writers on architecture.

As a text-book for young students, however, this is an excellent book, both on account of its clear analysis of the methods and development of Gothic construction, and also because Viollet-le-Duc's method of illustrating, whether or not we entirely accept the historical accuracy of all his representations, is so thoroughly architectural, so well calculated to make the student think about and realise the method of putting the stones together in arched masonry construction of this type. It is a satisfaction to note that Viollet-le-Duc had not that narrowness of view which besets too many French writers on architecture, who can see nothing but what is French. Viollet-le-Duc, in treating mainly of French Gothic, was at all events aware that there was such a thing as English Gothic, which has its own special characteristics. He does not commit the absurdity of M. Corroyer, of ignoring the very existence of the peculiarly English type of late vaulting, the fan vault; on the contrary, he traces out its development as the logical and natural result of what had preceded it. And he further shows how something of the same principle is to be seen in Late French vaulting, so far

as details are concerned, although the fan form, with its important suppression of the ribs as structural elements, was not adopted. "The system of Gothic vaults had come to this, which was necessarily its last mode of expression. To close the intervals left between the arches by ceilings, and, when necessary, multiply the arches until there were no spaces left among them which could not be filled by one or two slabs, this was to arrive at the limit of the system; and this was what they tried, often with success, at the beginning of the Renaissance, whether in religious monuments, or in civil architecture."

It is interesting to observe also that Viollet-le-Duc, so far from adopting in any way the absurd paradox subsequently put forth by M. Corroyer,* that the intersecting vault was derived from the pendentive and from the domical forms of Aquitaine, strongly emphasises the exactly contrary view, that the apparent but non-structural ribs put on the face of the pendentives in some of the churches of Aquitaine were really a first concession on the part of the domical builders to the influence of the cross-vault form; the rib was put there because the employment of intersecting vaults had already developed such a taste for that division of roofing surfaces by moulded ribs. It is instructive to compare his analysis of this incident in the style (page 151) with that of M. Corroyer. At the same time, we cannot follow Viollet-le-Duc in his idea that the Early English vault was more essentially domical than the Early French one, because the sex-partite form of vault with its shows an additional rib between the springings of the diagonal ribs. His conclusion from this is that the Early English vaulting compartment is essentially a domical compartment intersected by pointed arches. There does not appear to us to be any foundation at all for this comparative criticism, and a further study of English architecture would have shown him that the sex-partite form is by no means so common a characteristic in England as he supposed.

In attempting to give a logical constructional reason for every device in Gothic building Viollet-le-Duc sometimes goes too far. We certainly think he does so in his remarks on the treatment of the wall-buttresses beneath the flying buttresses at

* See *Builder* of January 21, 1893.

* Rational building; being a translation of the article "Construction" in the "Dictionnaire Raisonné de l'Architecture Française" of M. Eugène Emmanuel Viollet-le-Duc. By George Martin Huss, architect; Member of the Architectural League of New York, and New York: Macmillan & Co. 1895.

Beauvais, illustrated on page 238, and commented on in the following page. These, it may be remembered, instead of being built solid, are composed of thin shafts and canopies, with figures between the shafts. He says, "the intention was to obtain at the height of the piers of the choir* and under the flying buttresses supports not solid, though perfectly rigid, in order, first, to load the lower piers as little as possible; and secondly, to make the settling of the inner parts, built in courses and stiffened by the pillars set against stratum, naturally carry the weights inward." The argument, which can hardly be understood, perhaps, except in connexion with the illustration, seems to be refining a little too much. The lessening of weight is something, no doubt, but if that were the constructional object, it seems to be the only reasonable one which can be adduced. He surely cannot mean that, in the event of a settling of the wall, these thin shafts were to act as *futura* on which to turn the weight of the flying buttresses inward rather than outward. The only result of that must have been to have cracked them. The lightening of weight might be one object, but we believe that lightness and richness of decoration was at least as important an aim. The author seems to have discovered a little more here than the structure will bear.

The portion of the book which contains less that is familiar to architectural readers is that concerned with secular buildings and their construction. Of course the constructive problem here is much less exacting; and one result of this is described in a rather paradoxical, though striking, sentence. While the church architects, it is observed, seeking to avoid solids and diminish points of support, "at last reached the point of totally suppressing walls in rearing their grand religious edifices, on the other hand in civil architecture they augmented the thickness of the walls in proportion as prosperous conditions obtained, which created a demand for more comfortable, stronger, and healthier houses." To what limit of date does Viollet-le-Duc mean this observation to apply? In England at least, taking the course of castle-building generally, it certainly does not seem to be in accordance with observed facts. It would rather seem that, back to Norman times, the older the structure the thicker the walls. This seems rather an outcome of the desire to put picturesque and striking contrasts, which is one of Viollet-le-Duc's weaknesses, and betrays him sometimes away from plain fact. But many of the remarks on Mediaeval secular structures are of interest to all architectural readers, as they do not deal with theories now so well understood and admitted as the portion relating to purely ecclesiastical architecture, which after all is Gothic architecture *par excellence*.

Some of the remarks on questions of stability in Gothic buildings, and the means taken to ensure it, are well worth the attention of the student, as suggestions of first principles in building. Whether they are all to be legitimately derived from the example and practice of the Mediaeval builders may be another question. We remember the piers of Peterborough Tower, and the frequent deficiency of adequate foundations in great Mediaeval buildings, and doubt if the Mediaeval builders were really as scientifically minded as Viollet-le-Duc makes them out to be. Nothing is simpler in appearance, he says, than the enormous façade of Notre Dame at Paris, and this is one of its excellences. "In seeing such a mass, one does not suppose that it is necessary to employ certain artifices, studied contrivances, for giving it perfect stability. It seems enough to have piled up courses of stone from the base to the summit, and as if that enormous mass ought to maintain itself with its own weight. But to build a façade 20 mètres high and to build one 60

mètres high are two different operations; and the façade of 20 mètres, perfectly solid and well combined, might not, if its dimensions were tripled in every way, be able to stand upright." He goes on to observe that while a pier of one square metre in horizontal section and ten mètres high, gives ten cube mètres resting on a surface one metre square, if we double both dimensions we have a bearing surface of four square mètres supporting a solid of eighty cubic mètres, although of just the same proportions as to height and width. But we doubt if Mediaeval builders kept that truth intellectually before them. Had they done so, they would have taken more trouble with the foundations of their great buildings than they often did.

The term "rational" certainly applies to Viollet-le-Duc's treatise in so far as every conclusion in it is reasoned out. "Every man can express his opinion on a work of art," observes the author, "by saying 'This pleases me,' or 'This does not please me,' but no one is permitted to judge a product of the reason otherwise than by reasoning." That truth is at the bottom of the whole of criticism about architecture, which, both in regard to construction and design, is an art based on reasoning. But that does not justify the application of the term "rational architecture" as a title of the treatise. Greek architecture is quite as rational as Gothic; perhaps in its smaller details rather more so.

The translation is fairly done, but not always into the best English, though it may be, for all we know, the best American. The essay forms, however, as we have said, an admirable analysis of Gothic architecture for young students, and they, both English and Americans, may be grateful to the translator for bringing it more easily within their reach.

THE LATEST DISCOVERIES AT SILCHESTER.

THE results of the fifth year's work of excavations on the site of the ancient Roman City of Silchester, are now on view at the Society of Antiquaries' rooms. As in former years, the Society has thrown its rooms open to the public, and free entrance is accorded to all who may care to inspect the objects that have been discovered.

Silchester, as our readers know, is a large area of ground now all but entirely used for agricultural purposes, enclosed by the massive walls of Roman times. The old parish church and a farm-house are the only buildings within the walls, and the traveller might very readily follow the public road-way across the area without being aware of the site ever having been one that of a densely-populated and important city. The course of the ancient streets has been known for many years, since at harvest-time the corn showed a difference of colour sufficiently defined to indicate their direction at right-angles one to the other.

The site of the Forum was excavated many years ago, and fragments of Corinthian capitals and of their bases of large size were discovered, together with many other objects of unusual interest. In more recent years the Society of Antiquaries has, with admirable public spirit, devoted itself to a systematic exploration of the site, and year by year a certain portion, bounded by the courses of the ancient streets, has been thoroughly dug over. These *insulae* have already yielded important results, for not only have the sites of two quadrangular temples been found close to the parish church, but a great number of private houses of varying capacity have been excavated, and their ground-plans recovered. These show many interesting details of planning and construction, of special interest, since in no other site in England has investigation been made with any system on the site of a city. Roman villas in abundance have been investigated, but only here have town houses been laid

open for observation. Year by year the results of the excavations have been recorded in these pages, and of special interest was the record of the discovery what is believed, with every probability, to be the site of a Roman Christian church.

The past year's work has consisted of an excavation of four blocks or *insulae*, enclosed and defined, as was the case of blocks investigated in previous years, by the courses of the ancient streets. These blocks are known as Nos. IX., X., XI., and XII. The whole are close to the city wall, where here forms a well-defined angle to the course of the streets, the position being the north-west of the Forum, the line defining the centre of the city.

Blocks X., XI., and XII. form a triangle, having the base formed by the course of street going east and west, the second side being another street going north and south, while the inclined side is formed by the city wall. Block IX. extends to the east of the triangle. The blocks, except XII., are crossed diagonally by the modern public road which goes through the city.

No large or important building has been discovered, with the exception of the foundations of a good house, which has appeared had an open corridor on each side of dwelling-rooms; only another building, close to it, has been met with which may be considered to have been of domestic character. These two agree fairly well with the house which have been opened out elsewhere during the excavations of the previous year. All the other buildings now found are of different character, and different also to that have been discovered in the other city. They are evidently for manufacturing purposes. They have no good floors, and signs of fresco-painting have been found on any of them. But a good many curious furnaces have been met with of modest size, built of rough material, and showing signs of continuous use. They are of two forms, circular and oblong, and occur in positions very different from the other, some being found within buildings; many in the open air, clear of walls. They vary considerably in size, although none were found in previous years elsewhere, at least twelve have been opened, and of hearths only, as many as twelve, one of which twelve are of circular form.

These furnaces, found as they are so close together, show that they were all devoted to the same purpose, and the supposition supported in the room by the exhibition of plan of one of the houses at Pompeii, where similar furnaces of later date than the houses were found, and which were evidently used for dyeing purposes.

That a dyeing industry was practised at Silchester hardly admits of a doubt, for apart from the curious furnaces referred to, there have been found several wells, and, in addition, a goodly collection of querns, which the madder roots for the dyes would have been ground. Elsewhere, notably Block XII., rooms with underground floors as if for drying purposes, after the process of dyeing, have been excavated.

All the discoveries that have been made have been laid down to scale on a large plan of the city, which is exhibited, and the results of the last year's work may be briefly stated.

In Block IX. four various buildings have been found, they have opened at once from the main street since their walls come closely to its line. In like manner, the return streets bounding this block have buildings close up to them without any intervening fore-courts. In the rear, at some distance from the front road, are the houses already referred to.

Five buildings fill up the frontage of Block X., while a sixth is beyond them, the rest of the site having been vacant.

Block, or "Insula" XI., which comes close up to the city wall, has six buildings of the same character as the others.

Block XII. has two small quadrangular buildings, one of which has two diagonal

* This is a very clumsy translation of "au droit des piles du chœur." The words mean "in the vertical line of the choir piers."

crossing each other from the angles, ably used for drying purposes. In addition to the furnaces and the wells, an area excavated was found to contain a number of pits, probably old cesspools. There have also been met with pretty regularly wherever the ground elsewhere opened. Many articles of pottery, not, however, of the very best form or manufacture, were found in these, the principal of which are exhibited.

While the buildings here, as well as elsewhere, are mostly set out with careful regularity, and with their lines all at right-angles to the streets and to each other, there are some variations. Thus in Block IX one of the four buildings, although it comes quite close to the street, and its frontage is defined by the line of the street, is not at right-angles to it, and is the more noticeable since the building on each side of it is rectangular to the street. The dwelling-houses in the rear are still more inclined, although at right-angles to each other. While the great plan is all in the city, so far, to be set out so early, it is curious to see so complete a system in these groups of buildings, especially if they may be of older date than the layout of the streets.

A very little of architectural detail has been seen; the principal object is a well-defined capital, with a plain necking, which has been turned in a lathe. A base was also with, evidently belonging to the same or similar column. It has two toruses very close to each other, and, like the capital, is turned. The material is not unlike a coarse stone, probably oolite, from Gloucester. Both had been re-used as old material. A fine slab of even-tinted Purbeck marble also met with, although nothing was found to indicate what position it had occupied. There are clamp holes at its ends, and since it had been polished only on one face, it would appear that it had been used as a wall lining. But its great thickness almost forbids this supposition. It has been again polished, and the fine grain of the material is shown in consequence to advantage. The most curious object has been discovered is a cone of solid marble, about 2 ft. in height, which has had a cylindrical base, circular, terminating in a square. The form appears Phallic, and it is remarkable for having an Ogam inscription. Numerous cases contain the principal small objects found. These consist of bronze personal objects, and articles of toilette, one of which is inlaid with silver. There are also a number of bone pins, one of jet, a single piece of bronze enamelled in a Celtic pattern, a few pieces of window-glass, a set of glass vessels, one of which has part of a pattern produced by grinding, an engraved gem, a gold ring of elaborate design, a bronze hinge pierced with an openwork pattern of much beauty. Special interest attaches to a hoard of silver coins which were found in a black vase. These coins, from Mark Antony to the Emperor Trajan. They include a large number of intervening Emperors and Empresses, affording interesting evidence of the length of time in which Roman coins were kept in circulation, for it is evident that the early as well as those of later date, were all in use at the time when they were buried for security.

A bronze purse, to be worn on the arm, unfortunately empty, is one of the most interesting of the small articles. There are also several pieces of coloured wall plaster, decorated with patterns and various designs, but no examples of figured tessellated pavements have been found this year. Indeed, not one or two rooms paved with ordinary tesserae, no floors except of very ordinary description, composed of fragments of worked up in cement, have been found. That some pavements of rather better description did exist is shown by the presence of several octagonal paving tiles, exceedingly like those of modern make. But there are no specimens of the small square tiles that are necessary to fill in the inter-sections.

The large map is a very useful and important feature of the exhibition, for it brings before the spectator the general results of all the previous excavations, and it indicates the large amount of area within the walls that has yet to be laid open. So far about forty only of the 100 acres have been made to reveal the secrets of the long-buried past, and then filled in again for agricultural purposes. It is matter for regret that funds have not been subscribed so promptly as the importance of the work appears to justify, and we are sorry to see that a balance, although a small one, is due to the Treasurer. It is much to be hoped that a work so important as this may be carried on more rapidly during future years, and that the whole area may be investigated within a reasonable period of time.

NOTES.

THE Government inquiry into the alleged insufficient water supply of the Southwark and Vauxhall Water Company during the late frost has revealed an enormous amount of public inconvenience during the late hard weather, and a deficiency in the water supply which is probably unexampled in any other large city in the world. It has shown also the very strong public feeling on the subject, since witness after witness has come forward to detail the story of his domestic troubles. The ordinary average citizen does not attend inquiries of his own free will unless he is strongly moved. One witness stated that he had been without water from January 30 to April 13, and many other witnesses had very similar evidence to give. Whatever may be the report of the Government official, it is obvious that the public uprising against the water companies will have some practical results. One of these appears to be the establishing of a Government examination of the water-mains. This would be a perfectly reasonable measure; it would be analogous to the inspection of the permanent way of railway companies, and whether the water-supply remains in the hands of private companies, or is transferred to a public body, such examination is necessary in the interests of the general body of water consumers. Another point which is equally clear is that there must be a standard minimum depth fixed, above which water-mains are not to be laid. If this had been settled years ago an immense amount of public inconvenience would have been saved, since it must be borne in mind that though during the past winter the water famine has been more general than hitherto has been the case, yet that a winter rarely passes without some stoppage of the water supply in various parts of London and the suburbs.

THE Urban District Council for Wimbledon have circulated a Report on the failure of the water supply in their district, by Mr. C. H. Cooper, A.M.I.C.E. The total length of miles of main frozen in the district was 15.4 miles, of which 8.5 belonged to the Southwark and Vauxhall Water Company, and 6.9 to the Lambeth Company. Mr. Cooper reports that had the Water Companies insisted on the contractors carrying out the instructions in the Companies' own specifications to lay all pipes with at least 26 covering, very few mains would have been frozen during the late frost, though the frost had in some places penetrated to a depth of 3 ft. It was found, however, that the depth of the mains varied from 1 ft. 4 in. to 2 ft. 3 in. below the surface; and in no case was a main found with 2 ft. 6 in. covering. A small main in High-street, Merton, was found frozen at a depth of 3 ft. 4 in. below the surface, but on either side of this point the main rose to within one foot of the surface. Mr. Cooper is of opinion that under roads and in clay soil, 4 ft. of covering at least should be provided over the mains. The same report states that the metal used

in the recently-laid mains is very inferior to that of the older mains, and often much too thin—barely a $\frac{1}{8}$ in. thick in one instance mentioned, of which a sample was sent in with the Report.

THE announcement of an International Sanitary Exhibition to be held in Paris this summer from June 1 to September 15, ought to be a matter of considerable interest to English sanitary engineers and manufacturers. In accordance with a law recently passed the whole of the house drainage of Paris will have to be re-arranged in the course of the next three years, and it is no secret that English sanitary arrangements form to a considerable extent the model before the eyes of sanitary reformers in Paris. In regard to sanitary science and sanitary appliances the French have recognised lately that we are far ahead of them; so much so that some large hotels in Paris advertise among their advantages the possession of sanitary fittings by English firms; promises which are unfortunately not always realised. But there can be little doubt that any English exhibits at the forthcoming exhibition will receive a great deal of attention, and this is an opportunity which English sanitary specialists should make the most of. The Special Commissioner for the English section of the exhibition is M. Maurice Pères, 103, Boulevard Haussmann, to whom all enquiries can be addressed. The exhibition will be held in the Palais des Arts Libéraux on the Champ de Mars.

AS a result of the Conference held some months ago on the adulteration of Portland cement, the cement section of the London Chamber of Commerce is pursuing "an inquiry as to the effects of the alleged adulteration of cement with Kentish rag." The inquiry is apparently to be confined to a consideration of Kentish rag alone, and Messrs. Knight, Bevan, and Sturge have some reason for declining to subscribe to the expenses of the inquiry, until they know whether the admixture of gypsum and other substances is to be considered. An authoritative pronouncement on the effects of Kentish rag on Portland cement will, however, be better than no inquiry at all.

FROM the sixth annual report of the Highways and General Purposes Committee of the Gloucestershire County Council we are glad to find that the Council are attending to the important duty of erecting guide-posts, or, as they call them, "direction-posts." About 150 of these have been already fixed. The Committee have adopted an oak post with a cast-iron removable head and arms. This has been designed by the County Surveyor, and provides a durable and useful direction-post at the low cost of 17s. each. It is to be hoped that the Council will thoroughly carry out this useful work over the whole of their district, and that their example may prove an incentive to the authorities of some other counties, where this information to travellers is almost entirely wanting, to follow their example.

AFTER a disappearance of some months, for reasons unknown to us, our old French contemporary the *Semaine des Constructeurs* has suddenly re-appeared in a green wrapper and with the title of *La Semaine du Bâtiment*; in other respects it seems to be practically the same paper as before, under the conduct of the same editor, M. Marcel Daly, who was nominally the assistant-editor but in latter years really the acting-editor of the *Semaine des Constructeurs*. With his name is associated that of his brother, M. Raymond Daly, who is a lawyer (*Avocat*), and edits the portion of the paper devoted to jurisprudence. The *Semaine du Bâtiment* will evidently be, like its predecessor, an exceedingly practical paper, and one which may be relied upon for giving correct information on the subjects

treated in its columns, though it does not deal much with the picturesque and artistic side of architecture. The late M. Daly's larger and more important paper, the *Revue Générale*, we fear is to be regarded as default.

WE are glad to hear that it is proposed to institute a Professorship of Architecture in connexion with the "Glasgow and West of Scotland Technical College." Mr. Charles Gourlay, A.R.I.B.A., has for some time past been giving lectures on Architecture and Building Construction at the college referred to, and as the usefulness and interest of these has been practically demonstrated, the Governors have determined to increase the importance of this department of the college training by creating a Chair of Architecture and Building Construction. Mr. Gourlay, who has undertaken to devote his whole time to the duties of the office, has been recommended as the first holder of the Professorship.

THE last International Exhibition heard of is the one to be held next year at Mexico. It is provided already with a special journal to advocate its interests, *The Mexican Exposition*, of which the first number has reached us. This contains sketches of some of the intended buildings; which, however, will be of a very gewgaw description, so far as one can judge by these illustrations.

IT was expected that something quite exceptionally good in the way of electric lighting would be done by the Edinburgh Corporation. It is now over four years since they got their Provisional Order sanctioning them to set up a public installation, and it was only after an exhaustive study of the methods adopted in every important city that they decided on one combining the advantages of low tension direct for consumers near the station and high tension alternating for those at a distance. Naturally they chose Professor Kennedy as their consulting engineer, as, apart from his skill and experience, he is an Edinburgh man, and, therefore, likely to appreciate local prejudices. The only contracts that have not gone to English firms are those for the buildings, boilers, ironwork, piping, and arc-lamp-posts. In the station itself there are several novelties. Electric motors drive the feed-pumps, replacing the donkey-pumps which are ordinarily used to feed the boilers with water. They are also used to drive the mechanical stokers. We notice that Messrs. S. Z. de Ferranti are going to supply rectifiers for the arc-lighting on the alternating current circuit. Their success at Portsmouth has proved that this novel and ingenious method of lighting has got out of the experimental stage. The advantage of rectified current over alternating current in arc-lighting is that the top carbon is hollowed out, so that most of the light is thrown downwards instead of illuminating equally up and down. The lighting of Princes-street from end to end by arc-lamps is a conspicuous success, and it is now one of the best lighted—if not the best lighted—street in the country. The arc-lamps are suspended from ornamental brackets on standards at a height of 23 ft. They are placed 50 yards apart from one another, and are nominally of 3,000-candle power each, taking 15 ampères. They are all on the north side of the street, but, notwithstanding this, the south side is still better lit than it was formerly by the gas-lamps. On the north side there is, of course, a brilliant illumination, which has the effect of throwing the gardens beyond the south side into a very deep shade. This increase in the lighting of the street is not got without increased expense. Formerly, when the street was lit by gas, the annual bill was 400*l.*; now it will be 620*l.* The Corporation have spent 120,000*l.* of the ratepayers' money on electric lighting, but it is a very promising investment, as is shown

by the fact that no less than six separate companies tried to get provisional orders before the Corporation decided to apply themselves. Professor Kennedy has not only made the enterprise successful from an engineering point of view, but has specially studied the financial side of the question. The only little hitch that occurred was in connexion with lifting the roadways to lay the cables, the cellars of the shopkeepers being found in most unexpected places, and the owners most strongly objecting to them being interfered with. The price the Corporation is charging now is 6d. per unit. That this price will be reduced seems probable, as Edinburgh offers every advantage for successful electric lighting, being compact, and having shops, offices, and houses all close together.

A PAPER was read before the Society of Arts on Tuesday last by Mr. W. Gowland (late of the Imperial Japanese Mint), on "The Art of Casting Bronze in Japan." Numerous specimens were exhibited in the room to illustrate the subject. The following were among the points mentioned in the lecture. Mr. Gowland regards the history of Japanese bronze work as modern in comparison with much Asiatic bronze work. Japanese bronze casting could not be traced further back than the seventh or eighth centuries B.C. With the introduction of Buddhism, about 552 A.D., as the national religion of the country came the demand for colossal figures, bells, and other temple ornaments. The earliest dated example was, perhaps, a spherical box of gilt bronze found in a sarcophagus at Ten-o-jū, bearing date 705 A.D. Mr. Gowland claims this to be the earliest known bronze. Of colossal images, the largest is the image of Nara Daibutsu, in the Temple of Todaiji. It was not cast as a whole, but in comparatively small pieces, united by running in an alloy of tin and lead between the edges. The colossal and magnificent image of Daibutsu of Kamakura—the *cho-dō* of Japanese bronze casting—is smaller than the Nara Daibutsu; it was also cast in numerous pieces, but in this case they were joined by "burning together" with bronze. Feudalism was established throughout Japan in the seventeenth century, and to its influence is traceable the rapid development in Japanese bronze casting during that period. A section of the great bell cast for the Temple of Rochana in Kyoto, was shown by the lecturer as among the remarkable castings of this period. The bell is 14 ft. high, 9 ft. in diameter at the mouth, and 10 ft. in thickness of metal at the rim. Like all Japanese bells the rim is thickened internally, resulting in a constriction at the mouth, and productive of that gentle rising and falling characteristic of the boom of all the temple bells. Among numerous specimens of the work of this epoch of revival are the beautiful bronze gates to the tomb of Iyeyasu at Nikko. Among modern Japanese bronze workers the first place may be given to Suzuki Chokichi, who, although a naturalist, is free from the vulgarity which unfortunately characterises most modern Japanese bronze-work. This is manufactured usually for the European market; what the Japanese make for themselves is still excellent in design, and in accordance with the time-honoured traditions of the country. The patronage of the Emperor is beneficially directed towards encouraging greater excellence in bronze-casting, and the modern bronzes cast for the Imperial Palace equal in design and execution, the works of the old masters. In the preparation of the mould and core, the Japanese use vegetable wax, bees-wax, resin, and to a greater extent than either, chopped rice-straw—where great delicacy of line is required bees-wax and resin were employed. Ingates for pouring in the metal are not only placed at the top of the mould but in one or two tiers at the sides. After the wax model has been coated with thin clay, the mould is slowly dried, the wax

melted out, and the mould hardened by means of a charcoal fire. The typical Japanese furnace was highly commended, and has advantage of being easily transportable; indeed, the entire paraphernalia of a Japanese worker in bronze can be removed and fitted up in the temple garden, palace, or wherever else the bronze has to be placed.

NEVER before, we should think, in a great number, amounting to thousands, of interesting engraved wood blocks been offered for sale, as those were dispersed at Sotheby's auction-room last week. The various lots, realising, but few exceptions, ridiculously low prices, comprised Mr. Edwin Pearson's unrivalled collection, together with quaint and curious examples from old English printing-offices and the ancient stock of John White, Kt., Printer for the five Northern Counties of "Pilgrim's Progress," "Emblems," "Ramon Crusoe," "Philip Quarle," Henry VIII. Great Bible, and so on; and blocks designed and engraved by Thomas and John Bewick for the Newcastle printers. Much of Bewick's most beautiful and characteristic work is to be found in his vignettes, pieces, sylvan scenes, and his anglers' fishers' "garlands." Into these he introduces local buildings, such as St. Nicholas Priory, the towers of Dunelm Cathedral, the steeple and lantern tower of St. Nicholas, Newcastle-on-Tyne. "Select Fables," with oval cuts by the brothers, unaided by pupils, was first published, in three parts, by T. Saint, Newcastle, in 1784; it was reprinted (in Bewick's life-time) in 1820, by Emel Charley, who substituted brass plates for the woodcut borders, many of the illustrations having been injured in the interval. Subsequent editions were brought out by late H. G. Bohn (circa 1854), Longman (1878), and Ballantyne—the edition of 1879. This set of blocks, "with correct," a set of the "Tommy Trip" set, and a large stock of similar materials were bought for fifteen guineas. Pearson's collection of 2,300 blocks, engraved by the Bewicks, without pupils, for Saint, illustrate a variety of children's books, written with the children themselves, have gone out of fashion, sold for nine pence. In the earlier portion of the period covered by these, John Newbery had begun to publish his little picture-books "for little maids and misses"; some of them written for by Oliver Goldsmith, and their pictures engraved by "J. B." (John Bell). The blocks, with those of T. Bewick, form, respectively, the Salisbury and Newcastle editions of "Tommy Trip, Giant Wolf, and Dog Jowler," and those of "Goody Shoes" (London and Newcastle), were included in this remarkable sale, as also Bewick's "Hermit of Warkworth," and geometrical figures for Hutton's book of mensuration (1770); with several blocks by Seymour, George and Robert Cruikshank, Luke Clennell and Lee, pupils of Bewick, and other celebrated draughtsmen. An illustrated catalogue, by Mr. Pearson, sketches its place in the bibliography of the history of English wood-engraving.

THE loan exhibition at the Guildhall is one of the most interesting which has been seen there. Among the prominent pictures which first became known from twenty years ago, and which it is interesting to meet with again, are Poynter's "The Catapult," Lands' "Swannery invaded by Sea Eagles," John Millais' "Rosalind and Celia," and "Over the Hills" (which latter more justifies the admiration it excited at its exhibition), Mr. Leslie's "School Re-visit," Gerôme's "Bain Maure" and "An East Girl" (the latter we remember as one of the most brilliant things in Wallis's Gallery many years ago, when its contents were more brilliant than they usually are now),

tema's "Pyrrhic Dance," Phillip's "Larria," Fred Walker's beautiful little work, "Lushroom Gatherers," a small picture of "John's &c." Among the more recent works Sir F. Leighton's "Hesperides" and Mr. Fry's "Ariadne." Mr. Frith's "Claude" and O'Neil's "Eastward Ho!" carry back to earlier days and simpler theories of art. Neither painting will have many admirers now, in point of style and colour; O'Neil has the merit of having treated a subject of deep popular interest at the time, and of real feeling and a good deal of dramatic truth. The exhibition includes also some of the work lent by Sir J. C. Robinson, of the Tanagra figurines and bits of terra-cotta, and a good many other objects of decorative art to which we may turn. It is an excellent move on the part of the Corporation to extend the loan exhibition to objects of this class, so as to give the public persons who most frequent a free exhibition the opportunity, at least, of learning that art is something else besides pictures. It is true that the cases of bronzes and jewellery seem to excite little attention among the crowd at present, and many eyes seem rivetted on the pictures; but in time it may be discovered that there is something in the contents of the former; and in all events, it is giving the multitude a taste.

THE Society of Water-colours' Exhibition contains enough admirable works to make it a most interesting exhibition, notwithstanding that one or two of the most able members are either absent or have not contributed important works. Mr. Alfred Hunt's "Island" (23) is a small and very interesting study in atmospheric effect, but hardly a masterpiece. Mr. Hunt has for the first time (as we have noticed) been treating architectural subjects, in the shape of two studies of the Parthenon (97, 194); these are essentially landscape painters' studies, and the drawings are not in all cases correctly drawn, and the diminution at the necking being much exaggerated. The exhibition shows a considerable tendency towards the study of the effects of light. Among the best of these are Mr. Albert Goodwin's "Summer at Florence" (61), and Mr. Cuthbert's "Winter Night" (85); Mr. Eyre's "Autumn Twilight" (60) is rather misty in effect and execution; and something of the same manner seems to show in Mr. Walker's "Russet Woodlands" (114).

Walker's previous style was broader and more powerful. Professor Herkomer contributes a large and fine drawing called "The Golden Hill" (29), described as "A view of J. W. North"; a fine landscape, executed in tones and method of execution following Mr. North's manner, but with the fiction of three bathing goddesses or nymphs in the foreground, who assimilate well with the dreamlike character of the landscape. Among drawings in which, as we have put it, "God's daylight is predicted," are Mr. Cuthbert Rigby's "Spring" (1); all of Mr. R. W. Allan's, who never ceases to realise light and colour (see especially 131); and Sir F. Powell's "Springtime in the Flat Lands of Essex" (110). Mr. R. W. Melville's "Venice" (70) is an interesting study of colour and effect. Among the subjects Mr. E. R. Hughes, who at the exhibition attracted much attention by his rather repellent subject of the girl and the snake from the "Nights of Straparola," has lent to the same book for the subject of "The Bride" (59), an elaborate and finely-executed work, but not interesting. Mr. Reid is quite at his best in his "Tanagra" (1), where a beautiful Greek comes down marble steps to bargain with a child selling the terra-cotta statuettes which have once again become so familiar to the modern world. Mr. Tom Lloyd, in his work as "In the Rosy Light" (30), carries us to the pushing a special effect of sunset light too far for Nature; it appears more than one of his drawings, and though beautiful in a sense, looks somewhat

artificial. Among drawings in which architecture is prominent may be mentioned Mr. A. Goodwin's "Lincoln" (15); Mr. Rooke's "Spire of Chertsey" (72), a fine and carefully-studied view of the cathedral towers from a street in the town; Mr. G. Frith's "Keep of Kenilworth Castle" (90); Mr. Collingwood's "In St. Mark's, Venice" (143); and two scenes in Hoo from almost exactly the same point of view, by Mr. S. J. Hodson (101) and Mr. R. W. Allan (121); it is rather interesting to compare the two, and to see what a different appearance the same architecture assumes in the hands of two artists whose aims are quite different; one of them studying detail, the other looking mainly to effect.

ANOTHER set of Mr. Marks's bird studies is on view at the Society of Fine-Arts. They resemble the last exhibition pretty much in all their excellences—one cannot add "and defects" because there are no defects, except the general one of a certain degree of monotony inseparable from the repetition of bird studies pure and simple, not pictures with birds in them, which is another matter. Two or three of the best of the artist's oil-paintings of the superior bipeds are introduced, to give a little more point to the exhibition; among others "The Great Auk's Egg," one of the painter's most perfect studies of character, which it is pleasant to see again.

THE collection of paintings of the early British School at Messrs. Dowdeswell's gallery is of more interest than dealers' collections of this kind usually are. It includes more examples than one generally sees together of the landscapes of Barker; a fine portrait by Hoppner, another fine one by the almost unknown painter Kettle; two or three fine works by Cotman, some small pictures and sketches by Constable, some of them of unusual interest, and a beautiful landscape "Near Cromer," by Stark, remarkable for its combination of artistic quality with topographical accuracy.

THOSE of our London readers who care for what is beautiful in nature and art alike should not omit to look at the fascinating display of hyacinths, tulips, and daffodils in the range of flower-beds in Hyde Park, flanking the line of Park-lane. The range of colour in the hyacinths, from white to the dark purple of the "General Havelock" (which looks almost black when seen *en masse* at a distance), is most remarkable; each colour is grouped in one bed, alternating occasionally with a phalanx of golden-globed tulips, or delicate pale yellow daffodils which bow to each other as the breeze moves over them. One bed of daffodils is combined with a small delicate blue flower of lower stature, so that the daffodils seem to rise out of a sea of blue. These flowers, as every one knows, are as evanescent as they are lovely, and it is a pity the show attracts so little notice; people rush about to picture-galleries, and neglect a sight which has been said on the highest authority to be better than that of Solomon in all his glory, and which, according to our greatest English philosopher, affords "the purest of human pleasures."

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

AN ordinary meeting of the Royal Institute of British Architects took place on Monday last at 9, Conduit-street, Mr. F. C. Penrose, M.A. (President), in the chair.

The Secretary (Mr. W. H. White) announced the decease of Mr. John George Hall, elected an Associate in 1875; of Mr. Gordon Macdonald Hills, elected an Associate in 1858; and of Mr. Alfred Hayles Clarke, elected an Associate in 1892.

The President said that ninety-five persons were admitted to the Final Examination, qualifying for candidature as Associate, held from the 29th ult. to

the 5th inst., and that eighty-six of these attended and were examined. This number included seventy-five who had been relegated from previous examinations, five students, and six practising architects and chief assistants. The Examination was conducted simultaneously in London and Manchester. The following are the twenty-six who have passed, and are qualified for candidature as Associate:—Harry Alberry, London; Robert Saxton Besant, London; Edward George Collins, London; George Cowan, Southsea; Stanley William Worth Delves, Tunbridge Wells; Alfred John Dunn, Edgbaston, Birmingham; Edward Greenop, London; Charles James Hair, Twickenham; James Guthrie Henderson, London; Harry Hutt, Reading; Percy Leeds, London; James Alfred Ernest Lofthouse, Middlesbrough; Charles Kay Mayor, Fallowfield, Manchester; Robert Messenger, London; Orlando Middleton, Cheltenham; Francis Edward Morris, Reading; Frank Peck, London; Edward Penfold, Reigate; Frederick William Petter, Barnstaple; George John Thrift Reavell, London; Cecil Alexander Sharp, Banstead; James Hewitson Shaw, Walthamstow; Christopher Mitchell Shiner, London; Herbert Story, Birkenhead; Harry Garnham Watkins, Lincoln; William Charles Waymouth, London.

The President further announced that at the Preliminary Examination held in London, Bristol, and Manchester, on the 19th and 20th ult., 55 applicants had been exempted from attending; and out of the 83 examined, 59 passed, 22 were relegated to their studies, and 2 failed to pass. The total number examined in London was 47, of whom 32 passed; in Bristol 8, all of whom passed; and in Manchester 28, of whom 19 passed. The names of the 114 newly-registered Probationers are as follows:—Francis Henry Alderson, Kettering; George Anderson, Aberdeen; Henry Milnthorpe Appleyard, Liverpool; Herbert Weston Ayles, Weymouth; William Baillie, Glasgow; William John Ball, Warrington; Percy Montagu Beesley, Warrington; Arthur Edward Bell, Lincoln; Alfred Ernest Biggs, London; Lennox Godfrey Bird, London; John Silvester Blunt, Peterborough; John Percival Bridgewater, Salford, Birmingham; Guy Alexander Brown, Liverpool; Herbert Elisha Brown, Oxtord, Birkenhead; John Brown, Leicester; Robert Hepburn Butterworth, B.A. Cantab., London; Walter Cecil Butterworth, London; James Carter, Windermere; John Boswell Chapman, Englefield Green, Surrey; John Henwood Chorlton, Sheffield; Harold Robert Clayton, Canterbury; Tillaard Horace Osman Collings, Petersfield, Hants; Charles Heaton Fitzwilliam Comyn, Folkestone; Henry Fothergill Cooke, Hambrook, Bristol; Isaac Cooke, jun., Liscard, Cheshire; George Donaldson Copland, Glasgow; Harry Haighton Cork, Bacup; Grahame Cotman, London; James Dallas, Birmingham; Harold Henry Danby, Scarborough; Percy William Darbyshire, Knutsford, Cheshire; Charlie Davis, Swansea; Edgar Gustav Dickinson, Birkdale, Southport; William Driffield, Harrogate; Claud Germain Dunand, London; George Edwards, London; Walter Watkin Ellison, Wellingborough; William Ernest Emerson, London; Frank Quentery Farmer, Stalybridge; Frederick Victor Forrest, London; Frederic Douglas Fowler, Plymouth, near Plymouth; James Ernest Frost, Bridgewater, Somerset; Hubert Ernest Gilford, Edwalton, near Nottingham; Thomas Sedgwick Gregson, Scarborough; Charlie Hale, Fairfield, Kettering; Charles Llewellyn Hall, Whalley, near Blackburn; James Mitchell Halley, Hillhead, Glasgow; James William Hayes, St. Leonards-on-Sea; Percival Joseph Haywood, London; Charles Simkins Heath, Bushey, Herts; John Stanley Heath, London; Frederick William Higginbotham, Clontarf, Co. Dublin; John Higson, Blackburn; Frederick Robert Hiorns, Devonport; Victor Tylston Hodgson, Harpenden, Herts; Arthur John Hope, Atherton; Charles Henry Isaacs, London; Norman Harold Jameson, Bolton; Henry Jardine, London; Reginald Herbert Jeffes, London; Rupert Jeffries, West Walsall; William Jenkins, Llandilo, South Wales; David Jones, Bettws-y-Coed; Edward Oliver Jones, Penrhyn Is., Llandudno; John Ivor Price Jones, Cardiff; Frederick Henry Kimber, Newbury; Albert Edward Lacey, Bournemouth; Herbert Sleeman Lawson, Clifton, Bristol; James Constable Leed, London; Arthur William Lewis, Widnes; Charles Martell Lewis, Newport, Mon.; Robert Alexander Stewart Macalister, B.A. Cantab., London; Alfred Lightly MacGibbon, Edinburgh; Ernest William Marshall,

London; William Arthur Mellon, Edinburgh; Stanley Joseph Milner, Cardiff; James Millward, London; Reginald Morphew, Streatham; William Singleton Morton, Hendon; Francis Winton Newman, Parkstone, K.S.O., near Bournemouth; Henry Arthur Newman, Parkstone, R.S.O., near Bournemouth; Albert Edward Parry, London; William Frederick Peverill, London; Arthur Pickup, Blackburn; Arthur Robert Plowman, London; Percy Charles Poley, Hampton Hill, Middlesex; Walter John Prichard, Birmingham; Basil Procter, Newcastle-on-Tyne; John Rowland Roberts, Birmingham; Reuben Roberts, Chester; Thomas Henson Robinson, Crabtree, Pitsmoor, Sheffield; Ernest George Rodway, Weston-super-Mare; John Bedward Royle, Chester; Nathan Thomas Salmon, Reading; William Peel Schofield, Leeds; Thomas Faulkner Shepherd, Greenheys, Manchester; Ernest Edward Shepherd, Newcastle-on-Tyne; Peter Chalmers Smith, Aberdeen; Robert James Somerville, Glasgow; Charles Ernest Burgett Sutton, Great Sankey, near Warrington; Francis Edward Tabberer, Leicester; Henry Tanner, jun., Beckenham; William Todd, Hillhead, Glasgow; Walter Stephen Tucker, Glasgow; Arthur Bertie Venables, Chiswick; William Henry Watkins, St. George, Bristol; George Watson, Aberdeen; Frederick Christopher Wheeler, Horsham, Sussex; George Henry Widdows, York; Joseph Gilbert Wiles, Richmond, Surrey; Arthur Philip Lomax Wood, Liverpool; Alfred Ernest Woodhouse, Windermere; Gordon Lorimer Wright, Kelvinside Glasgow; Clyde Francis Young, Putney.

Papers were then read by Professor Aitchison, A.R.A., and Mr. William Young, on "The Use and Abuse of Marble for Decorative Purposes."

Professor Aitchison briefly touched upon the various kinds of stone classed as marble, and referred to the distinctive qualities and beauty of that material. The Greeks seemingly chose it mainly on account of the perfection to which it could be worked, and the delicate modelling it would express, and the Italians followed in their footsteps. Coloured and variegated marbles were in high favour among the Romans. Enormous quantities were used by them. The country-house of the Gordiani in one single portico had 200 columns, and in the same villa were three basilicas having 100 columns each. The greater part of the marbles used in the palaces, churches, &c., of the Dark Ages and Early Medieval days were taken from the ancient Roman buildings, which supplied the ancients have been rediscovered, and new ones have been opened. The great drawback to the use of flowered marble for columns that bear weight was its liability to flaws and defects, and the shafts should first be tested by the hydraulic press. With regard to the internal use of marble in England, it looked and felt cold in winter, and when buildings were not warmed it condensed the damp. Marbles mainly formed of carbonate of lime were useless externally, as the polish rapidly perished. The use of marble for decoration was to colour harmoniously by means of a particularly beautiful and specially coloured material. The finer flowered sorts had in their colouring every sort of motive and caprice that could astonish and charm. The Professor then described the colours of different marbles, and referred to the imperishable coloured decorations to be obtained by inlaying. Monumental colour was as hard to get as monumental form. The safest course was to adhere to one colour, or to some strong contrast of two colours, such as black and white, dark purple and white, or dark green and white. Black and white for columns, balustrades, and walls had a dignified effect, but the white should greatly predominate, or the effect would be too funereal. If an effect of richness, magnificence, or gorgeousness, or of delicacy or loveliness, were required, the same rules held good in marble as in painting. For a white or light ground, with colour interspersed, the other colours should be very light, or bright colours in small pieces; while for a dark or low-toned ground, white or very light tones should be sparingly used. The Professor then laid down certain maxims as to the employment of flowered marbles, and recommended for study in the use of coloured marbles the Pantheon, St. Mark's at Venice, St. Sophia, and other buildings, describing the effects there obtained by different schemes of colour treatment. Such use of marble, however, should only be attempted by those who possessed the rare gift of being able to harmonise colours, and had perfected that gift by study, observation, and trial. The Professor concluded by referring to a "Vision

of Paris," by M. Charles Garnier, and expressing the hope that it might be realised in London.

Mr. Wm. Young said that his remarks, based upon his own experience and observation as a working architect, would be confined to the use of marble in interiors. The employment of that material, which had been almost entirely absent in English architecture, had developed enormously in recent years; but the question presented itself, Did we always use it in the best way and in the right place? The true use of marble meant something more than merely lining walls with slabs of that material, set in courses marked off by horizontal and vertical joints after the manner of the marble wall papers, with which the walls of the passage and stairs of every ordinary house used to be covered. In marble as in other materials the architect should follow a certain order and scheme to bring out his design. The labour of the hewer, the sawyer, and the polisher revealed the beauties of marble; thought and skill must be added to make it beautiful in architecture.

To explain his meaning the author referred to the arrangement of the marbles represented in Mr. Alma Tadema's picture "At the Shrine of Venus." For use in a large way marbles should be few, but well chosen. With three or four different marbles handled by a master there was nothing within the range of architectural art, from simplicity to magnificence, that the architect could not accomplish. In selecting marbles for columns, arches, &c., it was sometimes exceedingly difficult to get the particular type wanted to ensure perfect harmony. Instances within the author's own experience were cited. Columns should be constructive, and not planted on for decoration; if possible, they should be monoliths. Square pillars should be solid marble, and not brick faced with marble slabs joined to imitate solid masonry. The marble on walls, where solid blocks would be useless waste, should be so treated as to show that it was a lining. Ordinary box-marble chimney-pieces, consisting of slabs of marble placed one in front and one on each side, as though to give the appearance of a solid block, the author considered not to be a true use of marble, and not architecture. With regard to the question, "Should Colour follow Form?" the author was of opinion that there was much sound truth in Mr. Ruskin's dictum that colour should be visibly independent of form, although in actual work it was found that colour, as a rule, must follow form. There were, however, exceptions. Instances and reasons in support of both views were shown and explained by the author by the aid of photographs of existing buildings, and the conclusion arrived at that a true and intelligent medium should be observed. The author next discussed the question *where* to use marble. If the *where* was wrong, the *how* could never be right. One thing was certain: marble had not been used in the present day where it ought to have been used. Largely employed in clubs and restaurants, in fish-shops and shop-fronts, in our churches marble was conspicuous by its absence. It would be well if modern architects would endeavour to see their work as their successors would see and criticise it with regard to the use of marble. A forecast of such criticism the author would try and put before them by imagining himself at a meeting of architects in the year 2395, to hear a lecture on "The Use, Non-use, and Abuse of Marble in the Architecture of England at the End of the Nineteenth Century," in which the hypothetical lecturer deals with the lavish use of marble in palaces, club-houses, mansions, halls of amusement, &c.; its abuse in drinking saloons, &c.; its non-use in Government buildings, where it would appear to have been prohibited by law; and—strange anomaly—its complete absence in the churches of the period, where only dingy brick and plaster were found, and sometimes a cheaper kind of stone sparingly used.

Mr. Young, at the close of his paper, exhibited several views of the Glasgow Municipal Buildings, by the limelight.

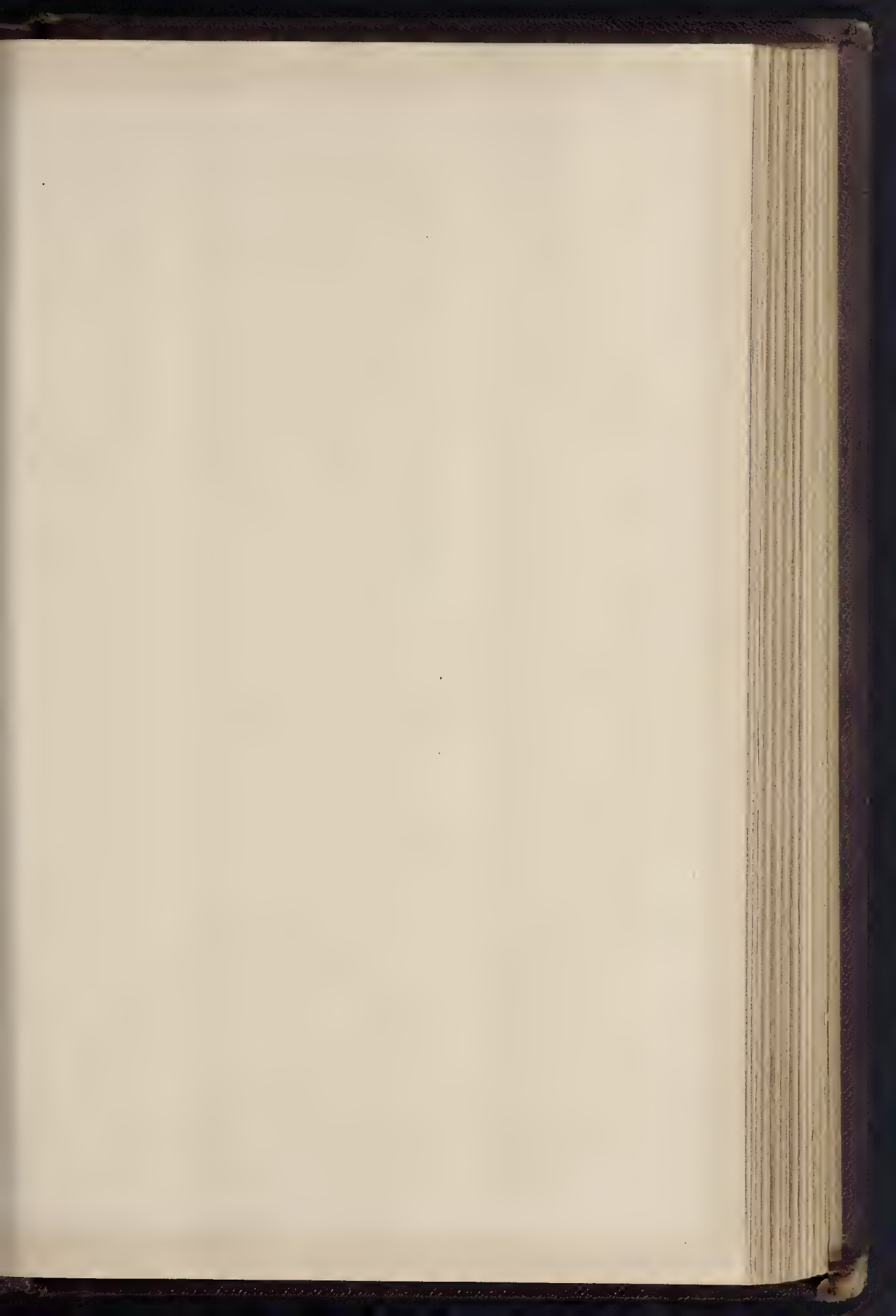
Mr. W. Brindley said that on being invited to join in the discussion, he had jotted down a few hasty notes. Professor Aitchison had remarked that polished white marble possessed a great charm, that one seemed to see into its substance. This seeming into the material was one of the most expressive remarks which could be made, and defined the white marbles used by the classic Greeks, the early Romans, and later by the Byzantines. But this definition rarely applied to the white marbles now commonly used, coming from Carrara, the bulk of the material being a bluish stone, and more or less opaque. Down to the fifteenth century, in Italy, they usually worked

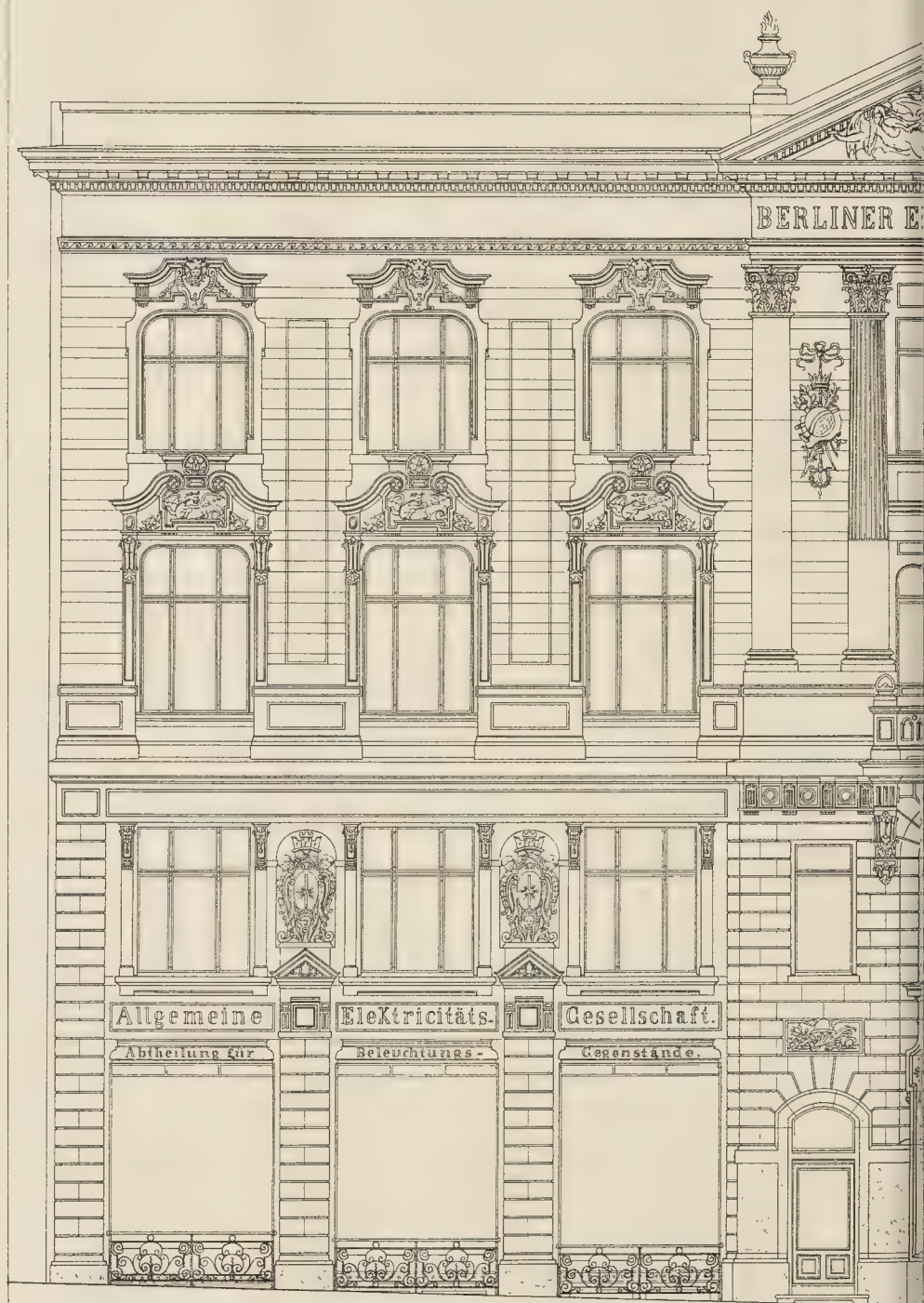
the surface with the chisel, sand-rubbing it up to the most. No doubt the Romans were right making their coloured marble columns monoliths, the grandeur of the effect produced being worth the cost and trouble. Where the block varied in colour, the deeper shade had better be selected for the bottom. When columns had to be jointed three stones were better than two for plain columns, but for reeded and fluted columns the joint should be made at the top of the reeds. There was a difference of opinion as to the joining of slabs to produce a pattern, either continuous or in panels. His opinion was that the practice was thoroughly legitimate, as it in no way represented a slab, and was the method used in Santa Sophia and St. Mark's, also in San Vitale, Ravenna, which were among the best examples extant. In all cases, as few colours as possible should be used, and frequently pleasing results were to be obtained with the light and darker portions of the same marble. Working out of old marble works in Italy he noted those combinations which were not quite satisfactory. Marble mouldings wanted special study, and he believed that there were a few younger men who were now on the right track. Difference of opinion occurred as to the boxing of a chimney-piece, but the beautiful examples of the Adam style still showed that method was right. The Adam chimney-pieces were always of the choicest material, and their method of construction are worth studying, many of the original drawings being in Sir John Soane's museum. The Romans, he believed, produced nearly the whole of their early work out of five quarries.

The President said that, as the evening very late, he would content himself with asking some member to move, and another to second the vote of thanks to the authors of the papers.

Mr. L. Alma Tadema, R.A., in proposing the vote of thanks, said that, in his studies of Pompeii, he had found that in the oldest houses the walls were decorated with painted slabs of imitative marble. He had also found in the houses the pivots of doors, that had gone, in lumps of beautiful onyx and precious marble which led him to think that the use of the precious marbles in Italy was much earlier than is generally believed. Mazois, in describing the house of Scæurus, speaks of the *atrium* having columns of Lucullan marble eleven metres in height. Indeed, the love the Romans professed for marble was so great that Julius Cæsar had had to tax them to fill his treasury. Turning to Mr. Young's paper, he wished to say that he was always afraid of breaking up a moulding. He might break up a flat surface with the veins of marble as much as they liked, but it was a break up a beautiful and refined moulding, for the view people would take 500 years hence it was interesting to think that from the use of marbles in the present day, they might be able to judge the present moral and political state of England—when the workmen were told that there was no greater happiness than to have a dinner, and when no workman was told that there was happiness in the work of producing something. Of course what the men cared for was the places where they could go and amuse themselves, and the churches were "not in it." So beautiful views of a building decorated with marbles had been shown during the evening, but he was afraid he could not admire the called pictures of slabs on the walls, but would much prefer real pictures. They were all a how delightful it was, in the case of a public building, to see the history connected with place depicted on the walls, an appropriate educating form of decoration.

Mr. G. Simonds seconded the vote of thanks, and said that it had been a pleasure to him, who, as a sculptor, had used marble for so great many years, to listen to the papers which had been read. The speakers, he thought, were rather unnecessarily down on the use of marble for exterior purposes. It was all well to say that the climate was this, that, and the other, and that marble would not stand up to doors. There were certain kinds which were very well; for instance, a good Ravenna marble, commonly called hard Sicilian, would stand the weather better than Portland stone. A few years ago he had to make a fountain, of which part was composed of brick figures, with some Portland stone, and some of Ravaciano marble. This had now standing for three or four years, and during the extremely bad winters the Portland stone, which was always wet, had cracked, flaked, while the marble which contained water and had been frozen through, was just as good







when put up. The precious marbles lost, no doubt, a certain amount of their polish, but what material would stand without that occurring, and why should people deem it essential that all the materials of which works of art were composed should be left to themselves for ever and a day, without a cleaning? Statues in this country were left to get frightfully dirty, and were then painted over a bronze colour. People put up marble slabs, and when they looked thoroughly bad had past praying for, they had them scraped and cleaned, and then put on a fresh polish. This could not be necessary if they were rubbed from time to time and kept clean.

The President, in putting the vote of thanks, said that Mr. Brindley had not only contributed in paper, but had also brought a most admirable collection of marbles for their inspection. If it could be consistent with his arrangements to save them for a few days, so that the members could inspect them, it would be a great additional advantage.

Mr. Brindley said that he would be quite pleased to do so.

The vote of thanks was then put and carried by acclamation, and Professor Aitchison, in replying, referred to the excellent specimens which had been exhibited by Mr. Brindley that evening. The proceedings then terminated.

THE INSTITUTE OF BUILDERS: ANNUAL DINNER.

The annual dinner of the Institute of Builders took place at the Hotel Victoria, Charing-cross, on Wednesday evening. Mr. John Howlem, M.P., the President, occupied the chair, and he was supported by Sir R. Rawlinson, K.C.B., President of the Institution of Civil Engineers, Mr. C. Penrose, F.R.S., President of the Institute of Architects, Mr. C. J. Shoppee, Col. S. G. rd, Col. G. H. Trollope, and Mr. Niemann Smith, Master of the Worshipful Company of Urupenters. The other guests included Messrs. ank May, J.P., L. J. Maton, J. H. Collis, and F. Ellis, and R. S. Henshaw, the secretary of the Institute.

The usual loyal and patriotic toasts were proposed by the President, Col. S. G. Bird responding on behalf of the "Army, Navy, and Reserve Forces."

The President next gave "The Engineers, Architects and Surveyors," and stated that the Institute was honoured with the presence of Sir Rawlinson, the President of the Institution of Civil Engineers, of Mr. F. C. Penrose, the President of the Royal Institute of British Architects, and of Mr. C. J. Shoppee, the past President of the Surveyors' Institution. Sir R. Rawlinson, in responding for the engineers, said he claimed to be a workman, having sprung from a working family. His father is a builder, and until he (the speaker) was twenty-one years of age, he worked (as the fit and proper) as a stonemason, a bricklayer, and as a mechanical engineer, to ground himself in the habits of his business. Coming to London, he had the honour to write the first report on sanitary improvement and to lay the foundation of the modern sanitary improvements which they had now obtained throughout the length and breadth of the land.

Mr. F. C. Penrose, in replying, said the architect, unlike the sculptor or painter, had no opportunity of exhibiting his work or of showing what way he benefited the public, except through the medium of the builder, and it was of the utmost importance to the members of his profession that the builders with whom they were associated should be of the stamp of the members of the Institute. It was also of the utmost importance that they should thoroughly understand each other in any work in which they were engaged. Another class of men to whom architects were very much indebted was the builder's man, and he had no doubt that the builders did endeavour to select the right stamp of men for the important work which they had to perform.

Mr. C. J. Shoppee also responded, and expressed the opinion that if the members of the various professions, named in the toast, continued to work in harmony the position of the builder would be well maintained.

Col. G. H. Trollope (President of the Central Association of Master Builders of London) then proposed the toast of the evening—"prosperity to the Institute of Builders." He said the Institute of Builders was a comparatively ancient institution before the Central Association came into existence. Most of the builders were members of the Institute and also of the

Association, and he did not think the simile of the House of Commons and the House of Lords was inappropriate in describing the respective positions of the two bodies. The Institute was incorporated, and the Association, or the junior body, so to speak, was left to deal with the many awkward questions—at the present time exceedingly awkward—which arose in connexion with the building trade. The Builders' Institute existed with great dignity and usefulness. It undertook various duties, such as negotiations with august bodies like the Royal Institute of British Architects, and left the Central Association to fight the working men, if necessary. The present position of affairs in that connexion was not very bright. He believed, however, that they would get over the difficulty, and he hoped the outcome of all their deliberations would be peace. For many years the Builders' Institute had been coldly received in many places. This year he formed one of a committee which had the arduous task of opposing, for the benefit of the trade generally, a Bill brought in by the London County Council for the better regulation of the building trade—he did not know whether it was for better or for worse—and they were able to obtain for the first time a recognition from the Government of the existence of the Institute, inasmuch as they had now the right to receive a copy of all by-laws before they received the sanction of the Local Government Board. Then when a contract was called for by Her Majesty's Office of Works exceeding 20,000l. the Institute had the right to appoint a surveyor. He was sure that it was the desire of every one present that the Institute should continue to prosper, and he wished to couple with the toast the name of the President, whom he greatly respected, and considered the embodiment of what the President of an important body like this should be.

The President, in responding, referred to some of the objects of the Institute, and stated that in the unavoidable absence of the late President, the duty of opposing the London Streets and Buildings Bill devolved upon Mr. Trollope, Mr. Dove, and Mr. W. Shepherd. He considered that it was mainly owing to their exertions that some considerable improvements were made in the Bill. Another thing the Institute had in view was the arrangement of equitable forms of contract, and the encouragement of the settlement of disputes by arbitration. They lived in the days of arbitration, and the builders in London were very desirous of having a fair and equitable basis for arbitration. Other objects of the Institute were to establish a benevolent fund and to provide facilities for social intercourse between the members and their friends. They had done their best to promote the latter object that night. The President concluded by proposing the health of "The Visitors," coupled with the name of Mr. Niemann Smith, the Master of the Worshipful Company of Carpenters—a body which (he said) was doing a great deal to promote technical education.

Mr. Niemann Smith, briefly responded, and stated that all the increase of income of the Company which he had the honour to represent was now used for the purpose of promoting technical education.

COMPETITIONS.

LEEK COVERED MARKETS.—The question of the appointment of an Assessor in this competition came up at the Urban District Council meeting on Tuesday, when six members voted in favour, seven against, and four abstained. The motion was consequently lost. The following letter had been addressed to the Council:—

"To the Members of the Urban District Council, 21st April, 1895.

LEEK COVERED MARKETS COMPETITION.
GENTLEMEN,—We engaged in this matter, and about a month ago submitted designs in accordance with your instructions.

We do not, of course, know who else engaged in the competition, nor have we heard what steps you have taken toward a decision.

But we feel sure we speak for all the competitors, as well as for ourselves, in respectfully urging upon you the propriety of calling in expert advice to assess the merits of the various designs, a course now universally adopted in competitions which are intended to be placed above blame or suspicion.

From your final instruction we submit competitors had the right to instruct your eventually taking this course.

We are, Gentlemen, yours faithfully,
W. SUGDEN & SON, LEAK.
MOSLEY & ANDERSON, Northampton."

ARCHITECTURAL SOCIETIES.

CARLISLE ARCHITECTURAL, ENGINEERING, AND SURVEYING SOCIETY.—On the 17th inst., at a meeting of this Society, a paper was read by

Mr. W. P. Gibbins on "Quantities." Starting with an explanation of the methods used in estimating the cost of buildings, the practices of architects taking off their own quantities, and builders being expected to take off themselves from drawings, were strongly condemned. The systems in use in various parts of the country were described. The north-country practice was easier of application, as so much detail was not dealt with as in the London practice, the two systems differing principally in the wood and mason work, and some other details. In "taking off," the lecturer considered that the best plan was to go through the building taking off each room separately, as this facilitated the reference to any item in dispute afterwards, the items of course being afterwards billed from the draft into the various trades. The necessity of checking all the items was insisted upon. The clauses often found in quantities, disclaiming any responsibility on the part of the surveyor as to their accuracy, was strongly condemned by the lecturer as very unfair to the contractor, whilst weighting the quantities was equally unfair to the client. A hearty vote of thanks was accorded to the lecturer, and, after an animated discussion, the proceedings terminated.

ENGINEERING SOCIETIES.

INSTITUTION OF CIVIL ENGINEERS.—To facilitate the building operations now in progress in Great George-street for new premises for the Institution of Civil Engineers it has been found desirable to abridge the Session, so that before the recess only the special meeting on May 2 and the annual general meeting on May 28 will be held, and these at the Royal United Service Institution.

THE INSTITUTION OF JUNIOR ENGINEERS.—A large party of the members of this Institution recently visited the Somers Town and St. Pancras Depôts, and Kentish Town locomotive sheds and shops of the Midland Railway, under the guidance of the district superintendent, Mr. Weatherburn, and other officials. At Somers Town were shown the 20-ton waggon-hoists communicating between the ground-floor and upper level, the hydraulic cranes and cage lifts, the three pairs of pumping-engines, the accumulators, and the electric light installation, consisting of six 25-h.p. Thomson-Houston dynamos. Passing on to St. Pancras, the hydraulic pumping-station there was seen, and the various cranes, capstans, trawlers, sack lifts, and goods hoist were examined. At Kentish Town the walls enclose two turn-tables which radiate 24 roads or stands; the engine capacity is 50, number of engines 120, and average consumption of coal (for all types of engines in the district) 28½ lbs. per mile; total working expenses 4d. per mile. In the repairing shops, in which eight engines can be repaired at once, are overhead-travellers operated by rope-gear. There are various machine-tools and lathes for dealing with the work, which, in addition to locomotive repairs, includes the maintenance of 35 stationary engines, 39 boilers, hydraulic machinery, and electric light engines. The oil-gas plant was also seen.

ARCHÆOLOGICAL SOCIETIES.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—A meeting of this Association was held on the 17th inst., Mr. E. P. Loftus Brock, the treasurer, in the chair. Mrs. Dent, of Sudeley Castle, sent for exhibition a careful rubbing of a Spanish tile from a church in Cordova, having considerable interest from its bearing the arms of the Count de Calbra, the captor of the famous Boabdil, the last of the Moorish kings, at the battle of Lucena, when twenty-two banners were taken by the Christians. King Ferdinand in reward for this service bestowed many favours upon the Count, amongst others, the right for himself and his descendants to bear as his arms a Moor's head crowned, with a gold chain around the neck, in a sanguine field, and with twenty banners bordering the escutcheon. These are distinctly visible upon the rubbing exhibited. This lady also submitted a large number of illustrations of encaustic tiles found at Hailes Abbey, Gloucestershire, now preserved in a pavement at Southam; others from Hailes Church and the Parish Church of Winchcombe, and from the ruins of Winchcombe Abbey, some being of the thirteenth, but the majority of the fourteenth and fifteenth centuries. Mr. Earle Way produced some examples of Roman pottery found in High-street, Southwark, on the site of the "Blue-eyed Maid" public-house, now being rebuilt. One of these formed a portion of a mortarium bearing the

letters "TUCEM," another, a piece of Samian ware, has "OF PASSIEM" within a circular label. Mr. Patrick, Hon. Secretary, exhibited some fine examples of ancient chest keys, one of Norman date, found many years ago at Birching-ton, in Thanet; another of Italian design and workmanship, sixteenth century, was much admired. He also exhibited a very beautiful gold medal, the badge of some foreign religious order, bearing on one side in high relief the head of the Saviour crowned with thorns, and on the other the head of the Virgin; the chasing of the ornamental bordering appears to indicate French design and execution. A paper was afterwards read by the Rev. H. Cart, M.A., describing very graphically his experiences of the journey and the impressions he derived from his recent visit to Carthage. The paper was illustrated by photographs of the chief remains of the ancient city, together with a plan of the celebrated Basilica of Damos-el-Kerita and of the famous cisterns, both before and after restoration, one of which now supplies the Goletta and Marsa, having a storage capacity of 27,000 cubic metres of water.

GLASGOW ARCHAEOLOGICAL SOCIETY.—The Glasgow Archaeological Society held a meeting on the 18th inst. in the rooms, 207, Bath-street, when Mr. David Murray, LL.D., Vice-President, was elected President in room of the late Mr. C. D. Donald, F.S.A., Scot. Dr. John Oswald Mitchell, F.S.A., Scot., was elected a Vice-President, and Sheriff Birnie was elected a member of Council. The following papers were then read:—"Note on Local Place-Names Available for the Designation of Civic Wards," by Mr. F. T. Barrett; "Notes on the Excavation of a Roman Bath at Newfield, Dundonald," by Mr. James Macdonald, LL.D.; and "The Story of Katherine Carmichael," by Dr. John Oswald Mitchell.

Illustrations.

BERLIN STREET ARCHITECTURE.

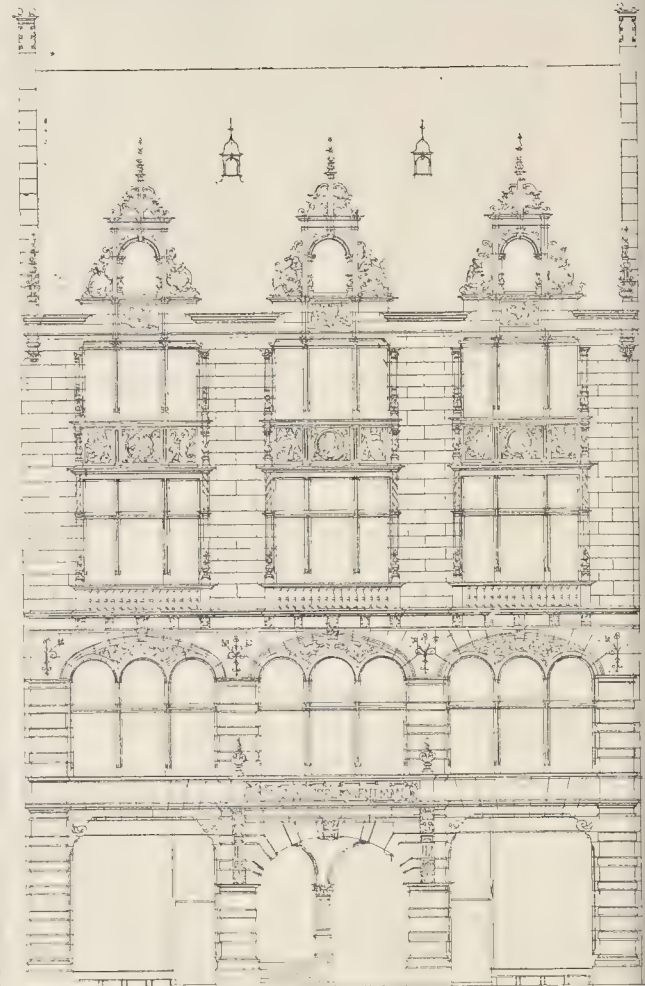
OUR illustrations this week form a collection of examples of modern Berlin street architecture as represented in the class of general domestic and business premises of the city and west end, and in the combination of shops and tenement buildings which are a feature of Berlin, as of Paris.

In buildings of this class Berlin architecture has shown a considerable development and improvement lately. In Government and Municipal buildings the Berlin "Academical" school of design still prevails, but in domestic and business buildings its influence is decreasing. In such buildings it is no longer considered necessary to have absolute symmetry on both sides of a facade, and the German architects have shown a disposition in these cases to study the architecture of other countries besides Italy. France and the Netherlands are much visited, and lately a good deal of attention has been given to English architecture, past and present, either through visits to this country or through the study of Mr. Gottsch's examples of English Renaissance, and of the illustrations of modern architecture shown in English architectural journals. Whether this English study can very readily be traced in the designs here illustrated may be a question, but at all events there is a great deal more attempt at picturesque and variety than was formerly the case. One satisfactory feature in the most recent Berlin architecture is the abandonment of stucco and of attempts at cheap grandeur and pomposity of style in that material.

Of the buildings illustrated, the oldest is the chief office of the Berlin Electricity Supply Company. This facade belongs, with a very little modification, to the old Berlin academical school. The next in order is the "Westminster" Hotel, at the back of which is a variety theatre. Messrs. Raven's warehouse front is an adaptation of German Renaissance. The same may be said of the two remaining buildings illustrated, in the main, though the "People's Restaurant" shows something of English influence, and "No. 16, Unter den Linden" shows a suspicion of French influence. We give some further details as to each building separately.

THE BERLIN GENERAL ELECTRICITY SUPPLY COMPANY'S OFFICES.

This building has to fulfil the requirements of a head office for the company which at present holds the monopoly of supplying Berlin with electric light. In connexion with the offices there are extensive show-rooms for electric fittings, which the company mostly supplies



Business Premises, Unter den Linden, Berlin. Herr Griesebach, Architect.

where it has the charge of installations. Room had to be found also for an extensive aluminium department, which is managed separately, and again has its own set of show-rooms. The upper floors have to accommodate some tenements on the main frontage, and some offices in the rear.

As will be seen from the plan of the first floor, the tenement is so arranged as to afford opportunities for giving receptions, at the cost of what we should consider the essential comfort of an abode. This is, of course, by no means unusual in a Berlin flat, but this example shows the want of comfort more plainly than is common. We may point out, for instance, the curious arrangement and position of the best bedrooms, and their distance from the bath-room and water-closet. A miniature journey has to be made through passages, dining-room, &c.; and the same holds good for the unfortunate servants in the distant kitchen, who wish to attend to the rooms. Visitors who wish to use the lavatory have to pass through the dining-room, and pass the kitchen, to reach it from the hall. Then, as will be seen, most of the rooms have the walls broken up quite indiscriminately with doors and windows. Where, we may ask, also, is the place for a bed in the front bedroom? This kind of planning, if it be termed planning at all, seems ridiculous to the English mind; and the strange part of the matter is, that there is no necessity for it, as there appear to have been both space and funds at the disposal of the architects.

The façades are in a freestone relieved slightly

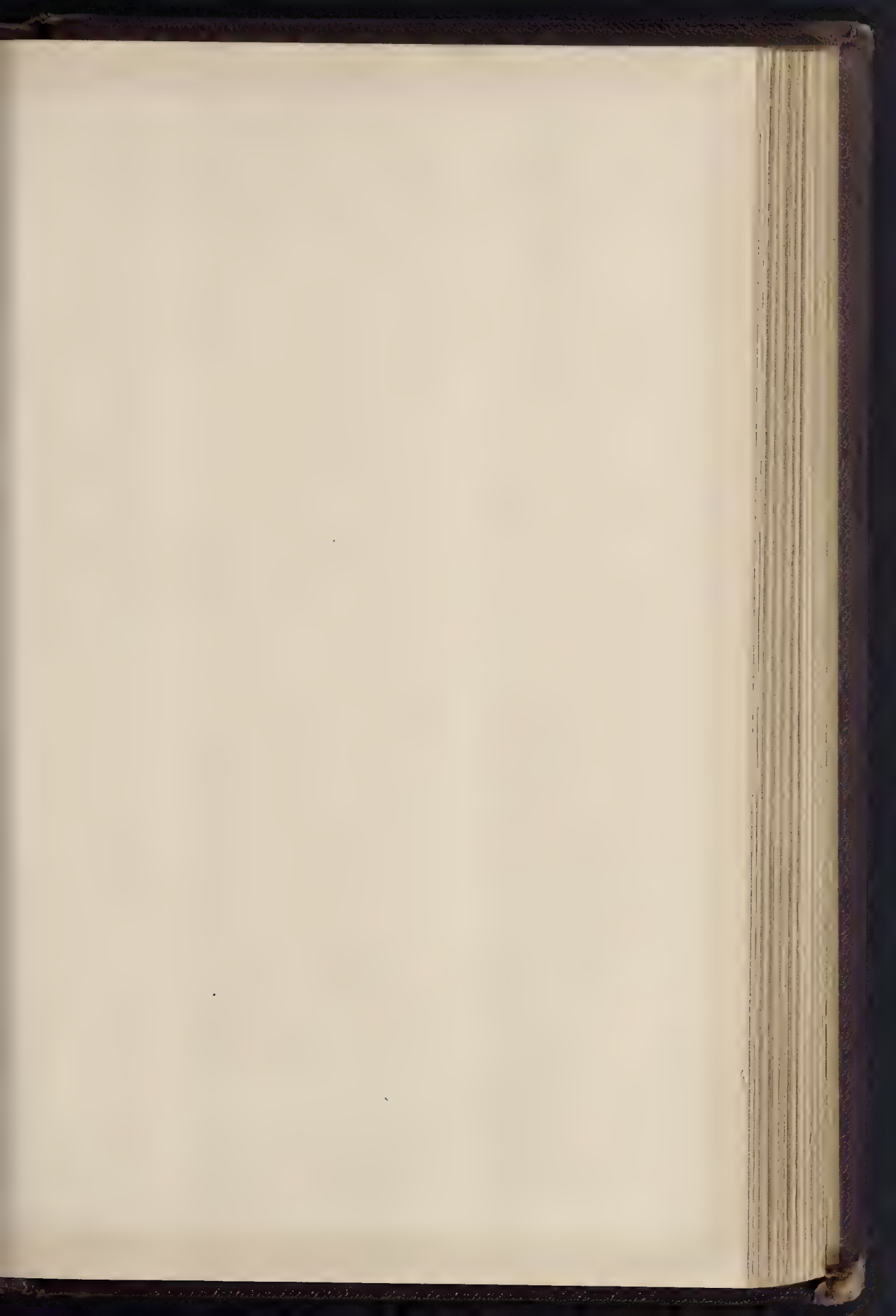
with bronze. The architects are Messrs. Crem & Wolfenstein, whose names are associated with the numerous new synagogues at Berlin and the provinces, a specialty in which they recognised to be experts on the Continent.

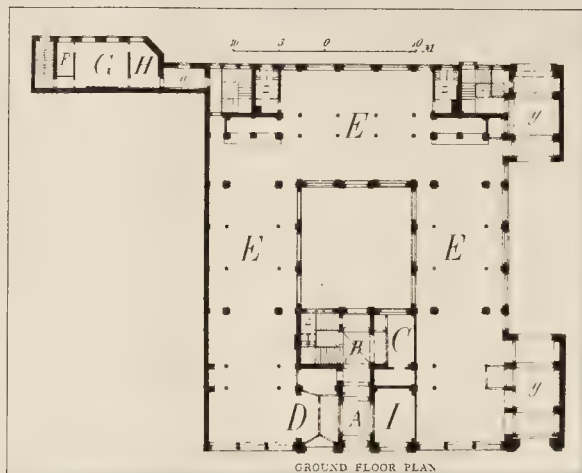
The following are the references to the lettering on the plan:—

- | | |
|---------------------|--------------------------|
| A.—Front staircase. | J.—Bath-room. |
| B.—Reception room. | K.—Stores. |
| C.—Music-room. | L.—Offices. |
| D.—Living-room. | M.—Office staircase. |
| E.—Dining-room. | N.—Lavatories. |
| F.—Boudoir. | O.—Larder. |
| G.—Bedrooms. | P.—Passages and lobbies. |
| H.—Kitchen. | |

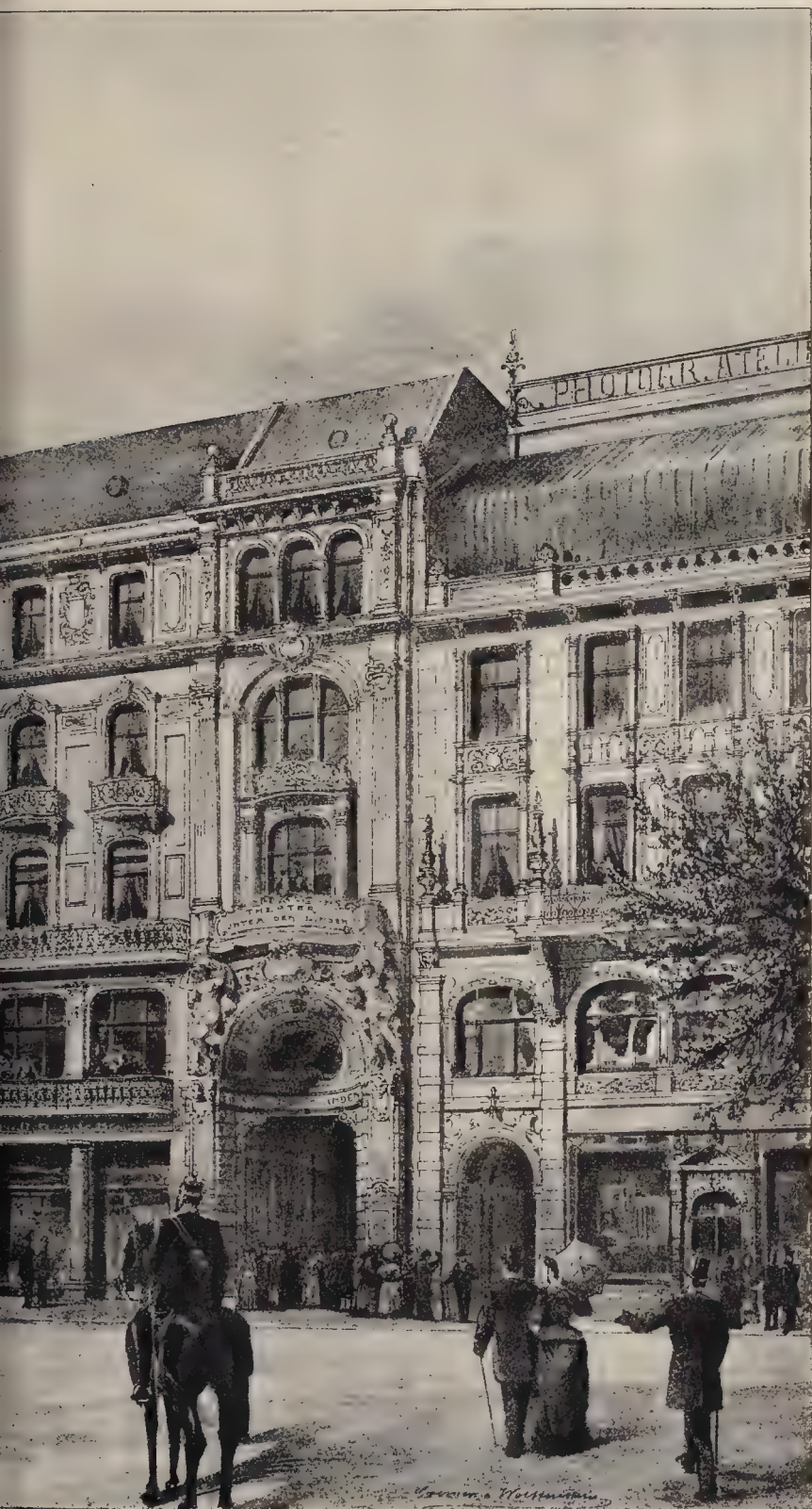
NEW WAREHOUSE AND OFFICES, BERLIN.

Messrs. Raven's warehouse, of which we illustrate the front elevation and ground floor plan, fulfils the proprietors' requirements for an extensive dry goods store, a large office, some stable and, curiously to say, a picture-gallery, and some banqueting-rooms. The site has a frontage nearly 200 ft., and a depth of over 250 ft. A large part of this is taken up by two spacious open courtyards, and a covered court measuring 70 ft. each way. The entire block, with the exception of part of the first floor and third floor, and small area on the ground floor level, is utilised for storage purposes. The front and central portion of the first floor contains the office referred to, and the frontage of the third floor taken up by the picture-gallery and banqueting rooms. The ground floor includes a forty-st





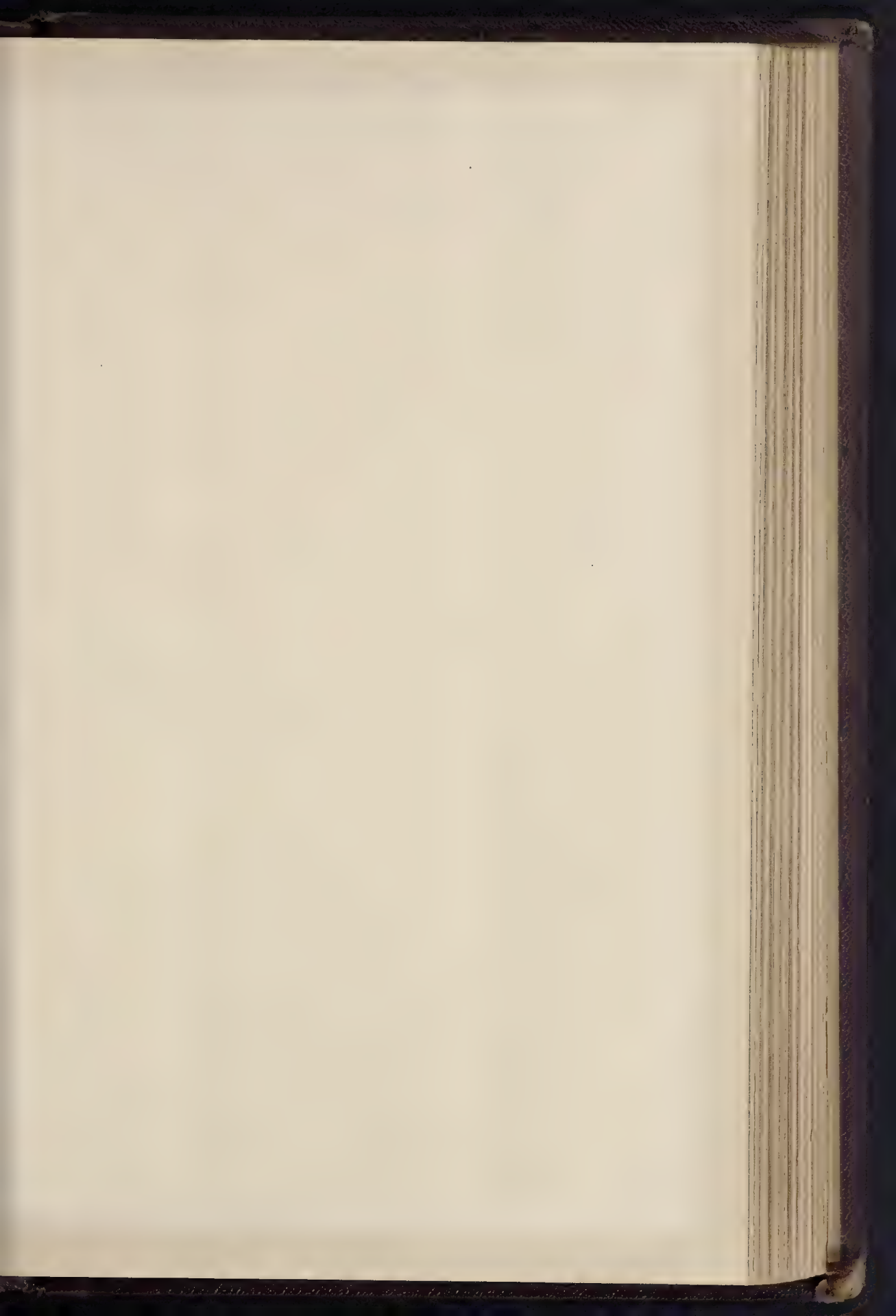
BERLIN S.
WESTMINSTER HOTEL, BERLIN

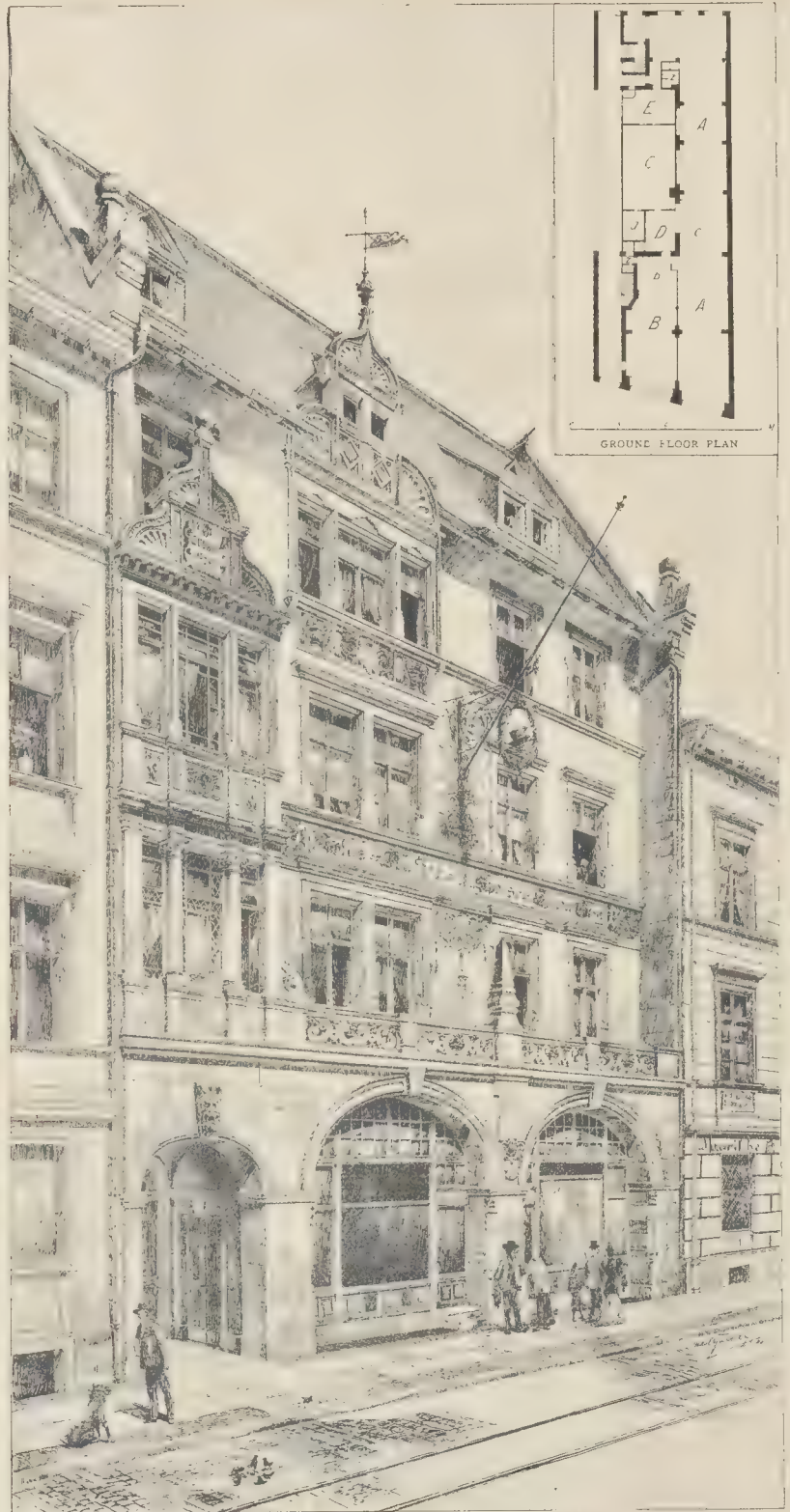


ECTURE.

R & WOLFFENSTEIN, ARCHITECTS

PHOTO SPRAGUE & CO. 48 EAST HAWARD STREET FLETTER LANE E.C.





H. SPRADLE & CO. 17, EAST HARBOR STREET, LONDON, E.C.

BERLIN STREET ARCHITECTURE.

PEOPLE'S RESTAURANT, BERLIN—PROFESSOR ALFRED MESSEL, ARCHITECT

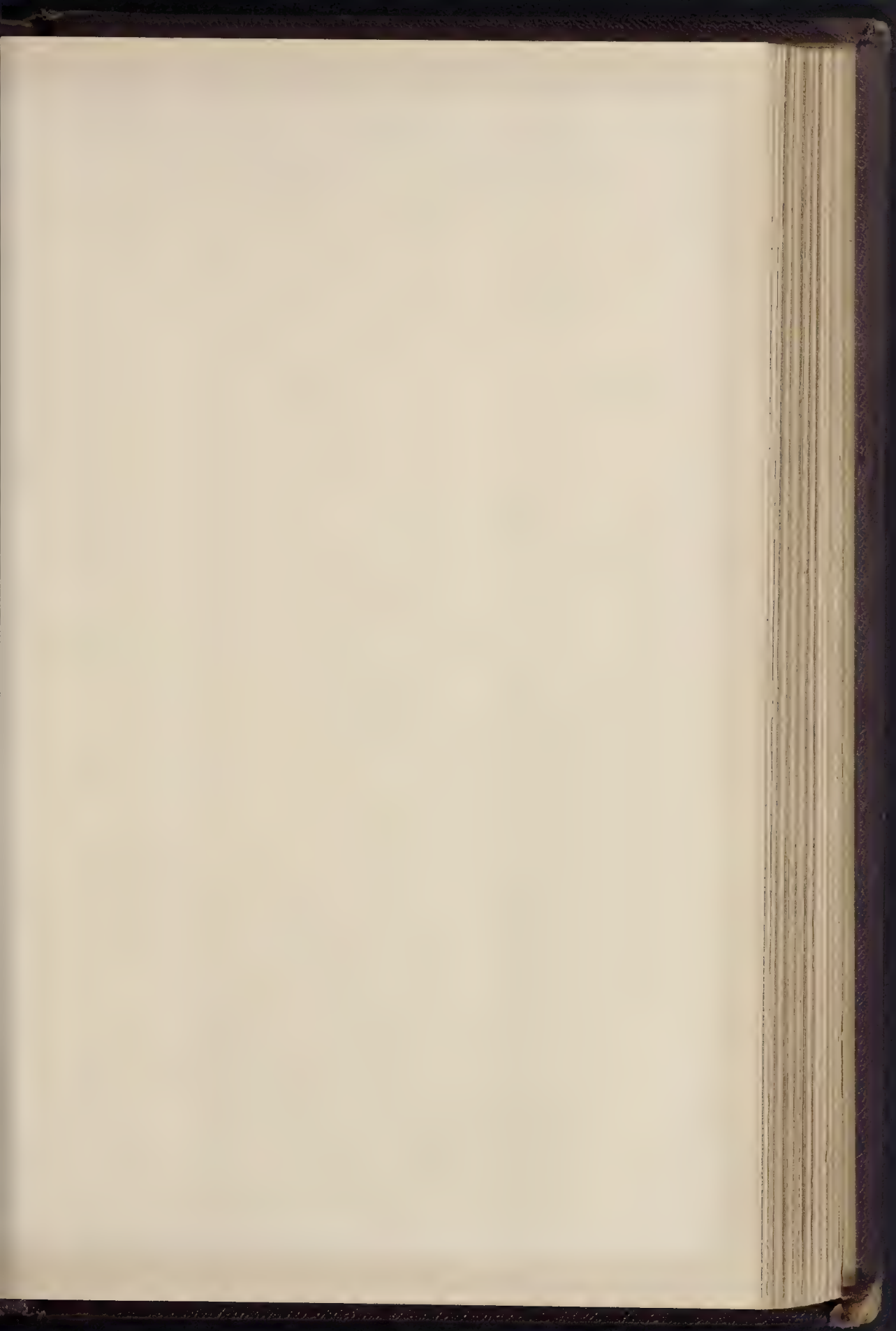


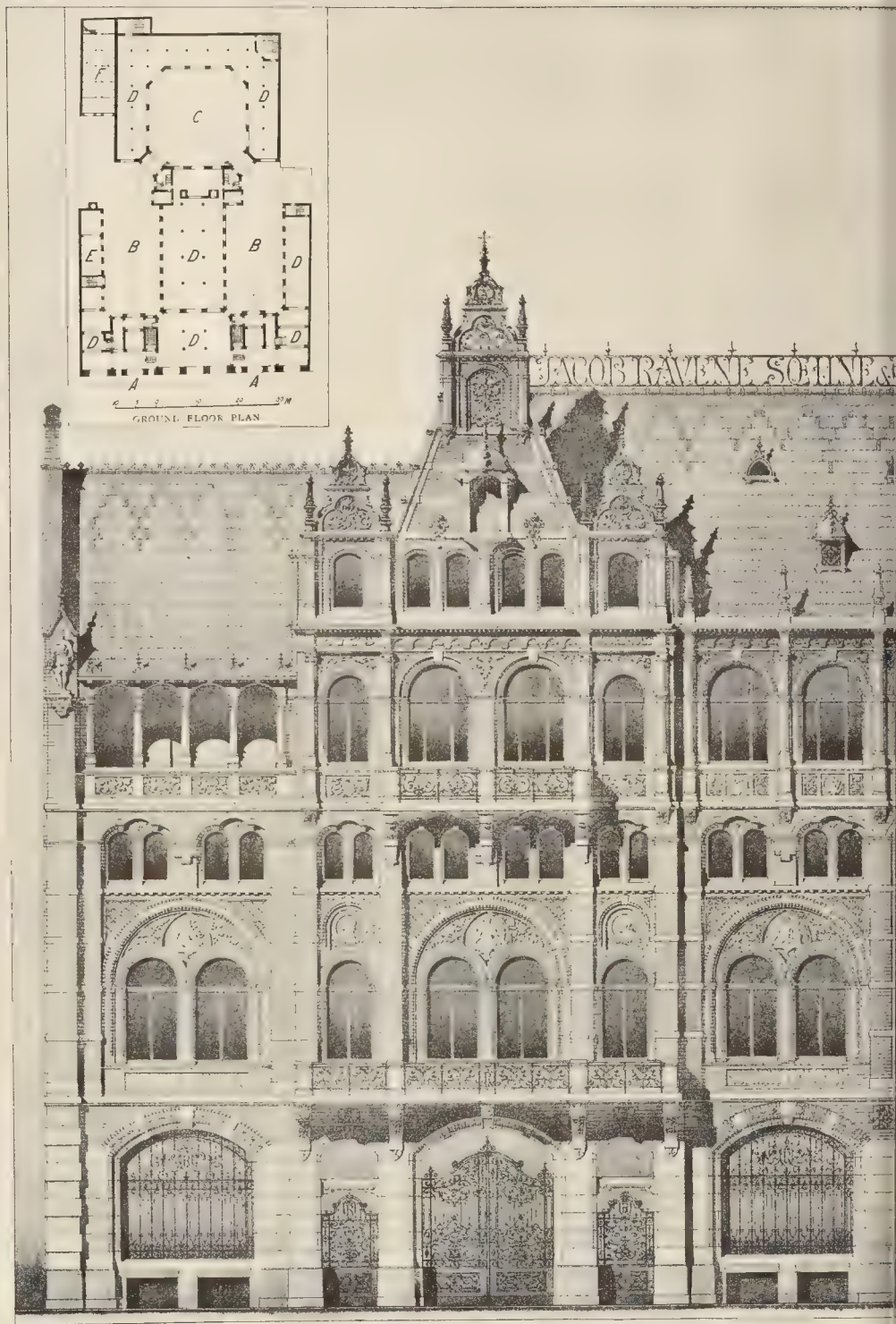
PHOTO SPRAG, L. & CO. 48 EAST HADDOCK STREET, FETTER LANE, E.

BERLIN STREET ARCHITECTURE.

BUSINESS PREMISES AND TENEMENTS, No. 16 UNTER DEN LINDEN, BERLIN.

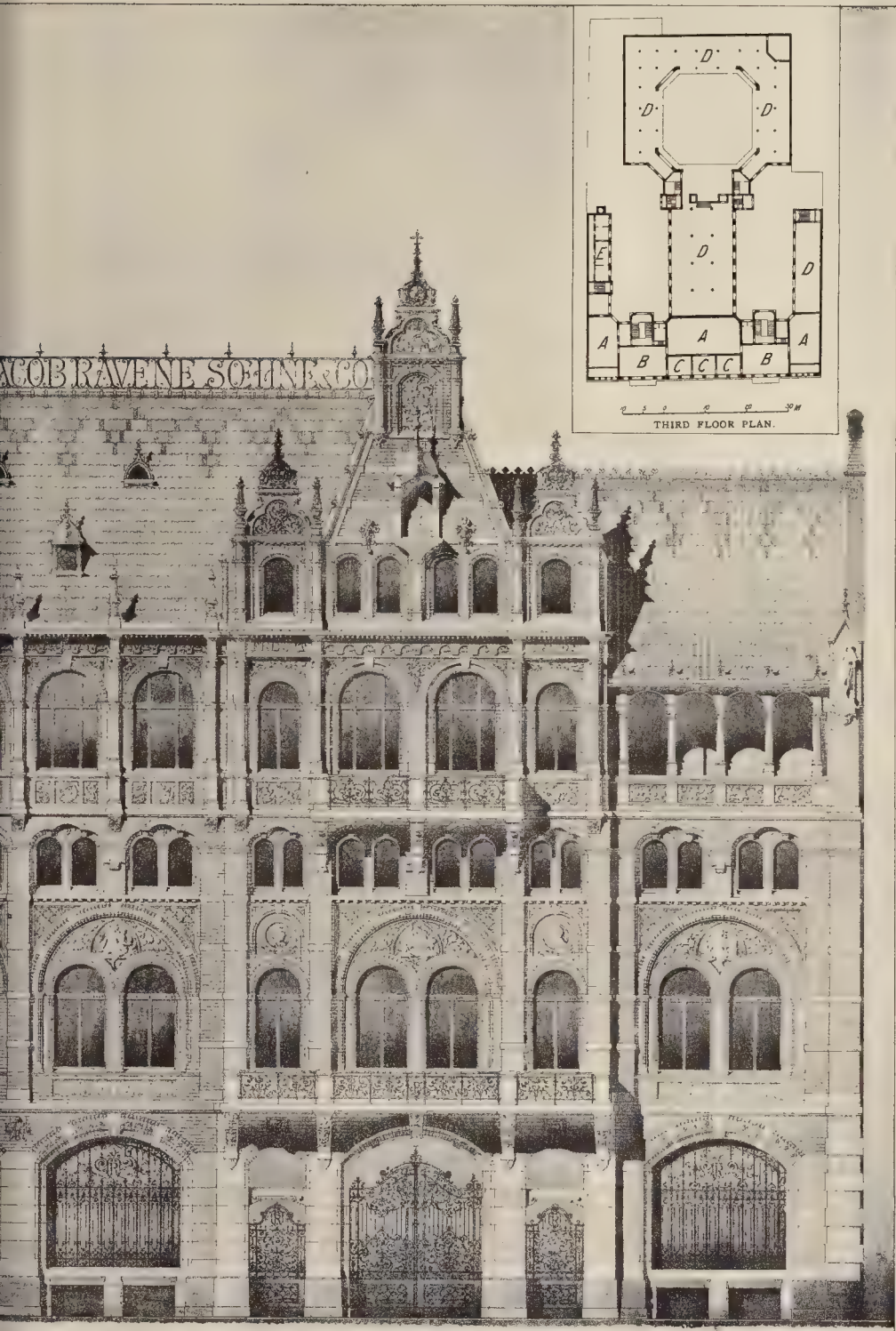
HERR GRIESEBACH, ARCHITECT.





1 0 5 10 15 Metres

BERLIN
NEW WAREHOUSE AND OFF



INK PHOTO SHRAGLE & CO. 4 & 5 EAST HANCOCK STREET FETTER LANE E.C.

TECTURE.

RS ENDE & BOECKMANN, ARCHITECTS.

stable, arranged in two tiers above one another, for twenty horses each.

The storage accommodation is very practically arranged, the least possible space is taken up by supports, and every part of the building is well-lighted and easily approached by carts. The latter have two large gates in the main front, one for entrance, the other exit. There is also ample air-space accommodation, and there are numerous lifts. The offices on the first-floor include a large general counting-house in the central block, lighted from both courtyards, and measuring nearly 100 ft. by 60 ft., and a number of private offices and small consulting-rooms. The latter are a feature of this establishment. There are two main staircases which have their approaches from the cart entrances.

The picture-gallery and banqueting-rooms are reserved for the principals of the firm. There are three top-lighted halls, one of which measures about 55 ft. by 30 ft., and two with side light, besides some smaller rooms. A kitchen and entry have been planned in connexion with this suite. The idea of having the halls in the warehouse is the outcome of the old Berlin custom of the heads of large establishments having their homes under the same roof as their stores and offices. As this custom does not lend itself to modern requirements, the late head of the firm at least wished some room to be set apart in his warehouse for family ceremonies and his collections.

The most modern methods of construction have been adopted throughout the block, which has its own central station for heating and lighting. The façades are in brick, with free-iron facings and coloured terra-cotta ornaments, and with much elaborate wrought-iron-work. Interfering with the business, and the planning has been influenced by this, as well as by the purchase of the ground on which the sidings stand. Messrs. Ende & Bosckmann, whose public works at Tokio and other buildings have frequently had occasion to illustrate the architects. Messrs. Hartung and Hohenberger are the chief assistants who have had charge of the work. Professor Ende is a Vice-President of the Prussian Royal Academy, and is one of the honorary correspondents of the Royal Institute of British Architects.

The following are the references to the lettering the plan :—

- A.—Main entrances and cart entrances.
- B.—Courtyards.
- C.—Covered court.
- D.—Stores.
- E.—Engine-room.
- F.—Stables (in two floors).

THE WESTMINSTER HOTEL, BERLIN.

The "Westminster" Hotel is one of two buildings lately erected by the "Unter den Linden" Building Association, the second being a variety theatre. The two blocks stand back to back; the former facing leading thoroughfare Berlin: "Unter den Linden," whilst the latter is its main entrance in the Behrend Strasse, which runs parallel. Messrs. Cremer & Wolfenberger were the architects of the hotel building, whilst the theatre was built from drawings by Messrs. Fellner & Helmer, of Vienna. The Berlin firm, however, acted as local architects in supervising the erection of the theatre, and two blocks were planned in concert to ensure least possible interference with the interests of two establishments. In order to give the theatre an easy approach from the more important thoroughfare, an "Arcade" was arranged for, the entrance to this arcade from "Unter den Linden" had to be designed so that it could be easily distinguished as not being part of the hotel. It will be seen from the plan, this arcade has, however, only been practically treated as a *porte cochère*, without the shops or booths that usually belong to these passages.

The whole of the ground floor of the hotel, with the exception of a small portion in the rear, is taken up by an extensive café, which is managed independently of the hotel proper. The building has its own entrances, and its own offices, the hotel visitors need not use this part of the building. The central part of the ground floor consists of a lobby, and hall with a porter's entrance, and from this a staircase with a lift forms approach to the hotel proper. The first floor is mainly utilised for the necessary reception, and for coffee, and reading rooms of the hotel. About twenty bedrooms are on this level. The upper floors are entirely utilised for bedroom accommodation; a kind of waiting-room or reception-room, however, being provided in each case for the different landings of the main staircase.



Berlin General Electricity Supply Company's Office, Berlin.
First Floor Plan.



No. 16, Unter den Linden,
Berlin.

There is little to call for attention in the planning, which would not fulfil London requirements, and is inferior to other examples of Berlin hotel work.

We understand, however, that this is partly due to the owners having changed the architect's "programme" during the progress of the building. The ample secondary staircases (in accordance with the Berlin Building Act), form, however, a good feature, and greatly reduce the risk from fire. The commencement of these staircases is seen on the plan, at the back of the café. All three staircases have each their own lifts. The hotel has 120 bedrooms, and the café on the ground floor will accommodate 1,000 customers.

The façades are in stone, enlivened with a certain amount of gilt wrought-iron work. The cost of the building was 48,000*l*.

The following are the references to the plan :—

- | | |
|--------------------|-------------------|
| A.—Hotel Entrance. | G.—Extra Kitchen. |
| B.—Hotel Hall. | H.—Extra Pantry. |
| C.—Hotel Office. | W.—Service. |
| D.—Café Entrance. | Y.—Arcade. |
| E.—Café. | Z.—Lavatories. |
| F.—Extra Larder. | |

PEOPLE'S RESTAURANT.

The new "People's" Restaurant, which has been erected from the plans of Professor Alfred Messel, is, as its name implies, an institution for providing cheap meals for the poorer class. Owing to the upper stories being let at good rents, the otherwise prohibitive expense of having an institution of this class in the very heart of the city is avoided. The ground floor, as will be seen from the plan, is entirely devoted to the eating-rooms and kitchen department. A *porte cochère* on the left side serves as an entirely separate approach to the main staircase which leads to the tenements above. The eating-rooms are divided off for men and women; and, as will be seen from the plan, about three times the space is given to the former, than to the latter. A counter serves for the distribution of the victuals, behind which there is a pantry, and then a roomy kitchen, and scullery with larder. These are all top-lighted. As will be seen there is excellent through ventila-

tion in the long room for the men, which has large windows at the front and back. The lavatory accommodation, however, appears insufficient.

The façade is of free-stone and stucco; the latter treated slightly in polichromy. Much attention has been given to the detail, and there is some good workmanship in the carving. The interior is treated quite plainly.

The following are the references to the plan :—

- | | |
|------------------|---------------------|
| A.—Men's Room. | a.—Larder. |
| B.—Women's Room. | b.—Women's Counter. |
| C.—Kitchen. | c.—Men's Counter. |
| D.—Serving Room. | d.—Lavatories. |
| E.—Scullery. | |

BUSINESS PREMISES AND TENEMENTS IN
UNTER DEN LINDEN.

We illustrate two buildings of this class, by the same architect, the elevation of one of them being shown in one of the lithograph plates, and the other in the subjoined block. The architect is Herr Hans Grisebach. Both buildings fulfil similar requirements.

Shops are required on the ground floor, offices on the first floor, and tenements (flats) on the upper floors. In both cases a *porte cochère* had to be provided so as to form a carriage approach to the courtyard, in accordance with that curiously extreme requirement of the Berlin Building Act which orders ample passage into all courtyards for fire-engines in case of need. There is nothing of special interest in the plans, excepting, perhaps, the arrangement of the staircase approach on one side of the passage. We illustrate the ground floor plan of No. 16, however, as a typical example. In this case one of the shops was intended for a florist, and hence the conservatory addition, which is very effective. The elevations of both buildings are of freestone, and show excellent masons' work and carving.

The following are the references to the plan :—

- | | |
|------------------|---------------|
| A.—Flower Shop. | D.—Work Room. |
| B.—Tying Room. | E.—Shop. |
| C.—Conservatory. | F.—Store. |

Correspondence.

To the Editor of THE BUILDER.

DURHAM COUNTY OFFICES
COMPETITION.

SIR,—It is nearly five months since the designs for the above were delivered, and for any information competitors have received the months may develop into years.

One would think that your "Note" of February 9 and "A Competitor's" letter of March 2 would have received some attention from the officials concerned in the conduct of the competition, especially as the latter contained an allegation which is at direct variance with the official reasons for the delay.

The statement in the letter is serious enough in itself to demand an explanation, for if the assessor is a "competent architect," as the writer seems to vouch for, then the competitors have a right to know on what grounds his award was set aside, if such has been the case.

"ANOTHER COMPETITOR."

"THIN PARTITIONS."

SIR,—In your issue of last week Mr. Norman Wright draws attention to our name as constructors of thin fireproof partitions in such a manner as might lead people to believe that the only advantages possessed by our methods of construction were those of economy of space, through comparison with, practically, what after all is little more than a "brick-on-edge" partition.

The hygienic fireproof and soundproof construction has distinct advantages which would never be obtained by any brick construction, inasmuch as a brick wall is bound to be a dead weight upon the floor upon which it is built, each brick, when laid, still retaining its individuality, whereas in the hygienic construction the partition when filled is one homogeneous light, self-supporting concrete structure hung from wall to wall, relieving the floor practically from all dead weight. This feature can very simply be demonstrated by cutting away 3 or 4 ft. from the base of the partition, when the upper portion will remain intact and quite rigid.

There are many and very distinct advantages in addition to the above to be reaped through the adoption of the hygienic structure as compared with brickwork, but as Mr. Norman Wright made the comparison simply in respect to economy of space, we have no right to ask your kind indulgence outside of the point referred to by him.

THE FIREPROOF CONSTRUCTION COMPANY.

"GRAYDON WHEEL" AT EARL'S COURT.

SIR,—There is not a particle of truth in the rumours that the foundations of the "Graydon Wheel" at Earl's Court have become sunken on either side. Knowing that the contractor, Lieutenant Bassett (retired R.N.), was not an engineer, when I gave him the contract I took the precaution to have the work well supervised by some of the most competent engineers in England, and from the very start of the detailed drawings even, and the foundations, the expert Engineers of the London County Council have passed and approved of every step taken, and where alterations were recommended by them (such as the enlargement of the stairway passages, &c.) such recommendations have been carried out, and the work has been constantly under their observation. The public, therefore, need have no uneasiness about the foundations of the structure. By publishing this you will reassure the public and greatly oblige.

JAMES WEIR GRAYDON,
Inventor, Designer, and Promoter of the "Graydon Wheel" at Earl's Court.

The Student's Column.

BRICKS AND TERRA-COTTA.—XVII.

PHYSICAL PROPERTIES.

UNDER this heading we shall give particulars as to the strength of bricks, brickwork, and terra-cotta, their absorptive powers, density, weight, hardness, and matters of like nature. These various properties are to some extent dependent on one another, and it will be the object of this article to define the limits of each, and to show in what way they are related.

Strength.—As in regard to many other building materials, the strength of bricks varies within wide limits, and a knowledge of this property is not so useful from the point of view of the bricks actually giving way when built up, as an index of their general quality from other standpoints. No one accustomed to using bricks in large quantities could ever be in doubt as to when the material was not strong enough for all practical purposes; its very appearance would proclaim the fact without the assistance of "crushing tests." When quoting the strength of bricks, therefore, it should

be borne in mind that it is not done to prove the applicability of the particular bricks mentioned as being strong enough, or otherwise, for building in walls, but for consideration with other properties to be given, in enabling the student to arrive at general standards of quality from a physical point of view. We confess that we do not attach so much importance to this as to some other tests, and for the following reasons.

The average brick of commerce, taken at random from amongst a number of its kind, is not a regularly-shaped body. Even where a casual inspection might lead one to suppose that it was, the application of a rough micrometer shows that it would be the merest accident if all its sides and faces were even or relative in length. If measured on the flat the height of its sides is but rarely found to be truly uniform all the way round. The dies of the machine between which the brick is crushed are, or should be, perfectly parallel to one another. From this, it follows that such an irregularly constituted body as the average brick is incapable of taking the pressure exerted by the machine and distributing it evenly over the surfaces applied to the dies. The projecting portions give way before the bulk of the material, the average strength of which is thus lessened, as it is also by the unequal strains produced.

In order to remove these defects it is customary to bed the brick to be crushed between thin pieces of pine-wood, millboard, or other material. Occasionally sheets of lead have been employed, and some experimenters have brought up the surfaces of the brick perfectly smooth and parallel by the application of plaster of Paris. Of these materials, the lead is probably the worst, as it flows so readily and fills minor interstices on or about the surfaces with which it is brought in contact under pressure. Clearly, none of them would be desirable if the faces applied to the machine were truly parallel. We do not get at the real strength of the brick by using them. Plaster of Paris, in the manner adopted by Professor Unwin, theoretically should give us the best results so far as bricks are concerned.

Taking things as they are, and considering results arrived at by the means just mentioned, it is satisfactory to note that the crushing strength of single bricks of the same kind does not vary within such wide limits as do many varieties of stone tested. In a measure, therefore, the result of experiments as to the strength of bricks of a certain kind is a better index of their absolute strength than with similar experiments on stone. There are a few exceptions to this, however, and we would wish for more tests on the strength of bricks of one kind, from one yard, but from different kilns. The results of the majority of the experiments before us evidently refer, in each case, to half-a-dozen bricks drawn from one firing. These, obviously, are not indicative of uniform manufacture, except in so far as one kilnful of bricks is concerned.

As an index of their capability of withstanding pressure in walls, crushing tests on single bricks are of next to no use. So far as this case, that many architects of note have refused to consider the strength of bricks apart from that of brickwork. Our information, however, on this latter point is rather scanty in respect of actual experiments, and is derived primarily from American, German, and Italian sources. At the same time, it should not be forgotten that we have an abundance of experiments carried out around us in buildings erected, and all that is required is that the results of these shall be accurately worked out, and clear statements made as to the character of the materials employed. This has only been done to a very limited extent. By such a process we should not, of course, arrive at the "crushing strength" of walls and piers, but we should obtain a mass of information on the subject of safe loads with the use of definite materials, built up under ordinary conditions. No machine hitherto invented possesses strength enough to crush piers of sufficient magnitude to invest the results with the importance they should have from a practical point of view. The only occasions an architect would be seriously called upon to calculate the strength of piers of brickwork, or rather the load they would safely carry, would be in the erection of a very large building, or in positions where they would be subjected to the pressure of heavy machinery, or of a large quantity of ironwork; and these are precisely the occasions on which feeble results of the "crushing" machine on very small piers (carefully made for crushing) would be of but little service. For the rest, the load that the smaller piers would carry should be

sufficiently well-known, from the experience of their more frequent use, to obviate the necessity for experiment on the subject.

In regard to the strength of terra-cotta; so much depends on the class of material with which building blocks are filled that it is practically useless to test the "crushing weight" of the shell alone. Under certain conditions, however, shell has to bear the brunt of the strain, and occasionally the thickness of the walls as compared with the size of the block is so great that the block might fairly be considered, for practical purposes, to be solid. The circumstances vary so widely with the character of building that it is not surprising that so few direct experiments on the strength of terra-cotta have been carried out. In its character as an ornamental brick and as mouldings, the maximum weight it will carry has barely been considered from a scientific standpoint. It is, naturally, of a somewhat brittle nature, from which may be inferred that it is not very elastic, except in the sense of recording diurnal changes of temperature. The certain varieties suffer from "fatigue" seems to be fairly well established.

Porosity.—This is, perhaps, the most valuable all-round test of which bricks may be subjected, but it is not the easiest one to carry out as some have supposed. On a former occasion we have alluded to the advantage of knowing the relative porosity of bricks; what we are principally concerned with now is how to conduct experiments on the subject to yield the most promising results. It is now generally recognised that there is an intimate relationship subsisting between the crushing strength of building stones, their specific gravity and the relative amount of water they absorb; but except in a limited sense the same cannot be said for bricks and terra-cotta. The vitreous film produced on many kinds of brick, whether distinctly visible, or ascertainable on a micro-examination, is mainly responsible for the difference in this respect between brick and stone; whilst local vitrification interiorly also impairs uniformity of results. Leaving that on one side, and looking at the matter in its broader aspects, it may at once be noted that a weak brick will usually absorb great quantity of water, but it does not follow that a strong brick will not do likewise. As the result of direct experiment we have ascertained that it is essential to draw a distinction between the porosity of a brick (*i.e.* the relative amount of water that under a certain pressure may be passed through it) and the quantity it will absorb. Many bricks imbibe a large proportion of water but will transmit hardly any; whilst others, equally absorbent, allow most of it to pass through. This is a property that does not appear to have hitherto formed the subject of direct experiment. Perhaps the best way to investigate it is to enclose the upper part of the brick in an impervious vessel, so that the former constitutes the base of the latter. The vessel is then filled with water to a definite height, when the column will sink as the brick allows the water to pass through. A graduated scale in the vessel and time-piece is all that is then required to register the rate of percolation. Care should be taken to thoroughly saturate the brick before commencing to read the scale, and, of course, it should be carefully set with as little cement as possible (which should also be tested) and so fixed as that the water passes through the brick only, and not through the cement as well.

Absorption, properly so called, may be tested in two ways, each useful in its own sphere. One is to thoroughly saturate the brick by immersing it in water, or by leaving only one surface exposed to the air, the remainder of the brick being under water; the other is to test its capillarity. The former is the process usually adopted, and the best to leave one surface exposed to the air, that the water may freely penetrate the sides of the brick, otherwise imbibition is unduly retarded in its endeavours to expel the air from among the pores of the brick. In this test it is essential that the water used shall be as pure as possible, and that both it and the brick tested be of definite temperatures, otherwise results will not be strictly comparable.

The power of capillary attraction possessed by a brick has never been previously studied so far as we are aware; yet, from the point of view, permanently damp walls it is an all-important feature. We find that the power of attracting moisture within is not so closely bound up with the rate of absorption of water as would naturally be supposed, although, of course, they are to a certain extent dependent on each other. "Re-rubbers," as a rule, present the phenomenon of capillarity to advantage; if one of these brick

be placed in water half an inch in depth the moisture will be seen to rise rapidly to a certain point, above which it will not pass, even if subjected to repeated experiments of the same nature. The height to which the water rises in each brick may be regarded as a rough approximation of its capillarity. In making this test the student should be careful to remove any moulding sand that may be adhering to the surface of the brick.

Apart from its use in determining the quality of bricks to be employed in damp situations, capillarity experiments may be directed to ascertain homogeneity, or otherwise, in the composition of bricks; also as to whether they have been thoroughly burned. For this, break the brick in halves, and placing one half in half an inch of water as before (not on edge), observe the manner in which the moisture line rises on the broken surface of the brick. If it rises in a tolerably straight line the brick is fairly homogeneous; if, on the other hand, (as is most frequently the case), that line is curved, or irregular, it shows that one part of the brick is more absorbent than another. The deleterious effects produced by hard lumps in the material are well brought out by this method, especially if the water be chemically coloured.

Density, specific gravity, and weight may be considered together, being so closely related. We purpose giving the weight of bricks when dry, also at various stages during absorption, and when fully saturated. Their true specific gravity, calculated with reference to total imbibition will be ascertained by the method detailed in our series of articles last year on "The Structure and Physical Properties of Building Stones." The only difference will be that the actual weight of whole bricks will be given instead of weight per cubic foot, though ratios of absorption must, of course, be stated relatively.

Hardness will be expressed in terms comparable with the well-known scale of hardness of certain minerals, from the first degree of hardness to the tenth.

GENERAL BUILDING NEWS.

CHURCH, COCKINGTON, DEVON.—On the 18th inst. the foundation stone of the new church of St. Matthew, Cockington, was laid by Mrs. Mallock. The church is to be built in two sections, and the present contract includes the nave and north aisle, and has been taken by Mr. R. F. Yeo, of Torquay. Mr. A. Nicholson, of London, is the architect. Mr. C. Noble being clerk of works. A short description of the building appeared in our issue for June 30, 1894, together with a double-page illustration.

NEW BATHS AND WASHING-HOUSES FOR DEPTFORD.—Some years ago Commissioners of Baths were appointed for Deptford to look out for sites, and in 1890 designs were obtained in competition, for adapting the old Deptford Lecture Hall as Public Baths; the designs of Mr. Thos. Dinwiddie, of Greenwich, were then selected, but objections were stated in the Vestry to the proposed site. Another site, a New Cross-road, of three-quarters of an acre has since been bought, at a cost of about 7,000*l.*, and the Commissioners have instructed Mr. Dinwiddie to prepare plans for the new buildings; these plans were exhibited to the Vestry of St. Paul's, Deptford, at the last meeting. The accommodation comprises first-class swimming-bath 120 ft. by 35 ft., with galleries; a second-class swimming-bath 80 ft. by 17 ft.; slipper-baths for fifteen first-class, and thirty second-class for men, and five first-class and ten second-class for women. There is a Public laundry, and administrative accommodation for the Board and Clerk, and Superintendent. It is proposed to sink a well on the site for the supply of the baths, for which a trial boring is to be made forthwith. In addition to the intended baths and wash-houses, the architect has been instructed to prepare plans for proposed New Vestry Hall and Offices for the parish, and a committee of the Vestry have been appointed to confer with the Baths Commissioners in this part of the project.

CHURCH, RUFFORTH, YORKSHIRE.—A new church has just been erected at Rufforth. The new church has been built on a piece of ground a little to the north of the site of the old church, and consists of a chancel, nave, and south aisle, and there is a square tower from which springs a spire. On the outside the building is faced with Killinghall stone with Whitty stone dressing, and Tadenaster stone is used for the inside. The roof of the south aisle is covered with lead, which was the lead of the old church recast, and the nave and chancel are covered with red tiles. The interior of the roof is of oak, barrel vaulted, with carved figures at the feet of the principals, and carved bosses at the intersections of the moulded ribs. The chancel is paved with black and white marble. The windows are of cathedral glass, with the exception of the east window, which is of stained glass, and the subject

of which is the Ascension. There is a total accommodation in the church for 180 people, the pews being of oak. In fact the whole of the woodwork in the building is of the same material. Some interesting remains in the old church have been built into the new one. The old east window is now in the east end of the south aisle, the Norman west doorway now forms the south doorway of the church, and the Norman priests' doorway has been used as the entrance to the new vestry. On the exterior of the south side of the tower is a clock, which was made by Messrs. Potts & Sons, of Leeds. The builder was Mr. J. Gould, Leeds, and the architects were Messrs. Demaine & Brierley, of York.

LUNATIC ASYLUM, RYHOPE, DURHAM.—The Sunderland Lunatic Asylum at Ryhope was opened for public inspection on the 15th inst. The architect is Mr. G. T. Hine, whose plans were selected in competition. The asylum is built of brick, with stone dressings, and in the main is two stories high. The building is of oblong shape. Around the entrance block in the centre are grouped the quarters of the assistant medical officer and a number of offices. The right wing is for the use of females, the left for males, and there is no direct communication between the two wings except by a division door on the ground floor. There are three blocks of wards—the epileptic block, the acute block, and the infirmary block. Each block has a day and night space, a general store, flour-room, scullery, and other appurtenances. Quiet patients sleep in dormitories; dangerous cases have separate bed-rooms; and there are also several divided and half-padded rooms for suicidal patients. Day-rooms are provided, in which the patients may enjoy themselves when not at work. The features of the interior are the recreation-room on the ground floor (used also as a dining-hall), with a stage at one end for entertainments, and, immediately over it, on the second floor, the chapel. A corridor makes the circuit of the entire building. Besides the main buildings, there are numerous out-offices, including an isolation hospital, for cases of infectious disease among the inmates, a mortuary, and a pathological laboratory for scientific purposes, the residence of the medical superintendent, and a lodge. Later, there will be cottages for the engineer, plumber, baker, stoker, and carpenter. The asylum and its annexes cover five acres. The rest of the land is intended for the cultivation of farm and garden produce. The number of attendants and nurses averages one to every ten patients. It is expected that the institution will be ready for occupation in May. When completed, 280 patients will find immediate accommodation. The contractor is Mr. J. Howe, of West Hartlepool.

NEW SCHOOLS, WIGAN.—On Saturday last the foundation-stone was laid of the new schools of St. George's Parish, Wigan, by Lady Powell, wife of Sir Francis S. Powell, Bart., M.P. The building is three stories high, and is to replace the present old mixed schools. Besides a large central hall on the ground floor and first floor, there will be, in the basement, a large gymnasium, cookery class-rooms and work-rooms, &c. The accommodation is for 900 children, and the cost will be 6,000*l.* Mr. A. Wigan is the builder, the architects being Messrs. Heaton & Ralph, of Wigan.

ADDITIONS, BALMORAL HOTEL, EDINBURGH.—Extensive additions and alterations have recently been made at this building, consisting of a new dining-room 55 ft. by 53 ft., assembly or dining-room 58 ft. by 27 ft., writing-room, thirty visitors' kitchen and servants' bedrooms, lavatories, remodelled elevator, remodelled bar and restaurant, &c. The work has cost over 9,000*l.*, and has been carried out by Mr. J. Macintyre Henry, architect, Edinburgh.

NEW SCHOOLS AT PONTYPOOL.—On the 16th inst. the opening of the Pontypool mixed and infant and the Cwmffwrdder infant school, by Sir George W. Kekewich, K.C.B., secretary of the Education Department, took place. The schools are Gothic in style, and are built of blue Pennant stone, with buff brick dressings, and Bath stone sills and cornices. They are built after the design of Mr. E. A. Lansdowne, Newport, the Pontypool School alone costing 4,000*l.* The builders were Messrs. Morgan & Evans. The Cwmffwrdder school is also built of blue Pennant stone. The builder was Mr. A. H. Bailey, Pontypool.

RESTORATION OF ST. STEPHEN'S-BY-SALTASH CHURCH.—The tower and other parts of this church have just been restored. The work has been carried out by Mr. A. Carkeek, of Redruth, in accordance with specifications prepared by Mr. George Fellows Fryne, architect, Plymouth and Westminister. It was at first intended merely to renovate the tower, but the sphere of operations was extended so as to include the whole of the west end, a considerable portion of the south side, and the entrance porch. The stonework of the whole has been carefully picked out from the rough-cast with which it had previously been coated, and is now pointed with Portland cement. The battlements of the tower, and part of the choir-staircase, have been taken down and rebuilt; four new pinnacles have been erected; an improved lightning conductor has been placed in position; and the whole surmounted by a central flag-staff and gilded vane. The inside walls of the porch, which were covered with plaster, have

been treated in similar fashion; and the oak roof, hidden by many coats of white wash, has been carefully scraped and exposed to view.

MASONIC TEMPLE, KELVEDON, ESSEX.—On the 18th inst. the new Masonic Temple which has been built at Kelvedon, was dedicated and opened. The building is of Bath-stone and red brick, and has been erected by Mr. S. Thorne, of Messing, from plans originally drawn by the late Mr. Alan Stewart, of Maldon, and completed by Mr. F. Whitmore, of Chelmsford. The facade is ornamented with a stone parapet, and the roof is surmounted by a cupola, which is used for ventilating purposes. Over the entrance-porch is a representation in stone of the crest of the lodge—a Knight Templar emerging from a castle and crossing a ford. Beyond the porch there is a vestibule, and extending from it a corridor leading to offices on the left and the banqueting-room. The vestibule and corridor are paved with tessellated tile. On the right of the vestibule is the reception or preparation room, and leading from that apartment is the Lodge-room, a chamber 40 ft. by 30 ft., lighted with windows of cathedral glass, on which are embossed various symbols of the order. The walls are supported by fluted stone columns with capitals in the Ionic, Corinthian, and Doric styles. At the further end is a raised dais. There is a parquet floor of oak and walnut. To the left of the vestibule are the lavatory and offices. The building is heated by hot-water apparatus, with radiators in every room, and lighted by incandescent gasaliers.

CLARK MEMORIAL HALL, PAISLEY.—The enlarged mission-hall in connexion with Thread-street U.P. Church, Paisley, was opened on the 21st inst. Owing to ground limitations it was impossible to make the new hall wider than the old one, but the length has been increased to 57 ft., and an open timber roof, 29 ft. in height in the centre, has been added. The hall is lighted by fourteen long windows, and these have been filled with stained-glass by Messrs. Stephen Adam & Son, Glasgow. At the east end of the hall is a raised platform. The hall is seated to accommodate about 450 people, and is heated by hot water pipes. The elevation from the street is two stories in height, and the style of architecture is in harmony with the adjoining church. Part of the lower story is utilised as a manager's room and session-house, each room being about 18 ft. square, with lavatory accommodation connected; while the upper flat has been arranged as a house for the church-officer. The contractors were:—Builder, Mr. George Henderson; slater, Mr. Charles Wallace; joiner, Mr. James Dunlop; plasterers, Messrs. John Fraser & Co.; painters, Messrs. Cowan & Stewart; gasfitters, Messrs. George Robertson & Son—all of Paisley. Mr. James Donald, of Paisley, was the architect.

RESTORATION OF ARBROATH PARISH CHURCH.—On the 18th inst. the memorial-stone of the restored parish church of Arbroath was laid. The old church, which dated from a few years after the Reformation, was accidentally burned down in November, 1892, and is now being restored from plans by Mr. J. J. Burnet, A.R.S.A., Glasgow.

SCHOOL, ULDALE, CUMBERLAND.—On the 15th inst. a new National schoolroom was opened at Uldale. The new school is built of red freestone dressings from Aspatia quarries, mixed with a lighter coloured sandstone from a local quarry. The main schoolroom is 37 ft. by 20 ft., and provides accommodation for 80 scholars, mixed. The floor is of wooden blocks, the walls inside are cemented. The class-room is 20 ft. by 16 ft. The building is slated with the best Buttermere slates with red Staffordshire ridges. The contractor for the whole of the work was Mr. J. H. Routledge, Mealsgate. Mr. A. W. Johnston, of Carlisle, was the architect.

PUBLIC WASHING-HOUSE, HUNTERFIELD, EDINBURGH.—A public washing-house was opened at Hunterfield on the 20th inst. The building consists of a boiler-house, the washing-house, which adjoins, being 35 ft. by 20 ft. The drying-closet is adjacent to the washing compartments. An ironing-room has also been fitted up. The whole cost amounts to about 1,000*l.* The architect was Mr. R. Smith, Gorebridge.

MEMORIAL CHURCH, LLANDUDNO.—The memorial stone of a church, which is to be erected in memory of the late Duke of Clarence, was laid on the 10th inst., in Llandudno, by the Duchess of Teck. The church will hold a congregation of nearly 1,000 persons. Its style is Early English, and the architect is Mr. Oldrid Scott, F.S.A.

CHANCEL, ST. AUGUSTINE'S CHURCH, NEW BASFORD.—The Bishop of Southwell (Dr. Ridding) has just consecrated the chancel that has been added to the Church of St. Augustine, New Basford, Notts. The chancel is 40 ft. in length, and of equal width with the nave. It contains a new organ-chamber, to which the organ has been removed from the side chapel; and some new choir-stalls have been furnished. The tender for the erection of the chancel was 1,335*l.*; but the total expenditure (including the renovation of the interior of the older portion and the furnishing of the new), amounts to between 1,500*l.* and 1,600*l.* Messrs. Evans & Jolley, of Nottingham, who also designed the nave and north aisle, were the architects; and Messrs. J. Hodson & Son the contractors.

DEEDS TO BUILD OVER A STREAM. Messrs. KILGUS, cutlery manufacturers at Sheffield, who own property and premises on both banks of the small stream, the river Porter, have appeared in the City Recorder's Court against the action of the Corporation in restraining them from enlarging and connecting their warehouses by building over the stream. The Corporation are willing to consent to make a bridge over the stream, and to allow a building of a certain nature to be erected on the bank, so far as its relation to the stream was concerned. On behalf of the Corporation the following excerpt from the Act under which they were proceeding was read:—"No person shall at any time hereafter, without the consent of the Corporation, build, erect, or place within the borough any building or erection of permanent character in or over any bed-course or waterway of any river or stream." The Recorder absolutely prohibited unless those parties got the consent of the Corporation. Further, the Act said: "Provided also that any riparian owners who may desire to build, erect, or place, or cause to be built, erected, or placed, any building or erection of a permanent character in or over any part of the bed, course, or waterway of any river or stream within the borough may give notice in writing to the Town Clerk of the Corporation, and in the event of the Town Clerk signifying in writing to such riparian owner the refusal of the Corporation to consent then such riparian owner may appeal." The Recorder thought the Act clearly gave the Corporation an enabling power to make an exception in the case of riparian owners holding property on both sides of the stream. A bridge, it was pointed out, would not meet the needs of the case, and the "bright goods" would be spoiled by exposure to the air in being carried across it. The objections urged on behalf of the Corporation were that the proposed building would interfere with the proper inspection and keeping clean of the stream, which is 18 ft. wide. The Recorder, in giving judgment, said that the one hand cannot be against the other. It was intended to be actually a bridge. It was intended to be a bridge for the Corporation large powers with regard to the repression of those nuisances which had in so many instances turned streams passing through large towns into sources of pollution and misfortune, and the efforts, therefore, that were being made

by the Highway Committee were deserving of praise and gratitude. It was his duty to help the Corporation to keep the streams unpolluted, but the whole tenor of the second part of the statute was to the effect that the riparian owner was to be in a preferential position, and was to be entitled to call on the Corporation to give him certain privileges which did not belong to any one but the riparian owner. It was with great difficulty that he had arrived at a conclusion. The Corporation surveys on each side would consult, and present him with a joint report. The case being thus practically *sub judice*, we offer no opinion on it, for that reason only, and not because we have not a tolerably decided one.

CHURCH BUILDING SOCIETY.—The Incorporated Society for Promoting the Enlargement, Building, and Repairing of Churches and Chapels held its usual monthly meeting on Thursday, last week, at the Society's House, No. 7, Dean's-yard, Westminster Abbey, the Rev. Canon C. B. Hutchinson in the chair. Grants of money were made in aid of the following objects, viz.:—Rebuilding St. Mary's Church, Swansea, 350*l.*, and towards enlarging or otherwise improving the accommodation in the churches at Glaphrom, St. Leonard, near Oundle, 100*l.*, Killmarsh, St. Giles, near Rotherham, 20*l.*, Poynton, All Saints, near Sherborne, 25*l.*, and Watney-street, Christ Church, in the Parish of St. George's-in-the-East, 20*l.* The following grants were also paid for works completed:—Fleur-de-lis, St. David, in the parish of Bedwely, near Cardiff, 100*l.*; Brixton, St. Mary, near Plymouth, 40*l.*; St. Margaret, near Ashbourne, 20*l.*; St. Mary, near Bodmin, 40*l.*, and Barnsley, St. Paul, 30*l.* In addition to this the sum of 477*l.* was paid towards the repairs of thirty-nine churches. The Committee sanctioned the appointment of Mr. R. Norman Shaw, R.A., as President of the Committee of Honorary Consulting Architects in the place of Mr. Ewan Christian, deceased, and two vacancies in the Committee to be filled up by Mr. T. Graham Jackson, A.R.A., and Mr. C. H. M. Mileham. The annual general court of this Society will be held on Wednesday, May 8, at the Church House, at half-past two. The chair will be taken by the Archbishop of York.

A BUILDING ACT FOR CALCUTTA.—According to the twenty-sixth report on "Sanitary Measures in India," recently laid before Parliament, the present recorded death-rate of Calcutta—twenty-seven per 1,000—places the public health in a "favourably fictitious light, and the conditions of life in the metropolis of British India are still highly unsalubrious, notwithstanding the progress made in sanitary reform. The health officer, Dr. Simpson, attributes much of this to the defective state of the law regarding streets and buildings, which is radically bad, as, under its sanction, unhealthy houses are built, and areas in the town created, which, as they grow, can only breed pestilence. When a house may be built anywhere without reference to efficient ventilation, proper drainage or surroundings, or in any way of passage, or the respective of their width, and in such a manner as to obstruct the light and ventilation of the neighbouring houses, so long as it is 4 ft. away from them, the creation of plague spots in different parts of the town is only a question of time. While this process continues, the money spent on the new Harrison road and lanes cut through bustees (collections of native detached houses), will have but a poor return, because the destruction of insanitary areas effected by new roads and lanes can never even keep pace with the progressive creation of areas much worse in type. A Calcutta bustee, as it used to be, even with its drawbacks, is infinitely preferable to what is springing up in its stead. Formerly a landlord let the whole of his land for bustee purposes, and one-story huts, built irregularly and according to the requirements of the hut-owner, were erected on every available space, the spaces between the huts serving generally as passages, but occasionally the owners left sufficient room for cleansing and scavenging. Drainage and ventilation were left to themselves, and as always happens when too large a population is crowded on too limited space, these bustees became very unhealthy, and the source of epidemics. At an enormous cost narrow lanes have been cut through a number of the largest, and drainage laid down, but its advance is being counteracted by a new development, the land of bustees and of vacant spaces being sold in small plots upon which brick buildings are erected. The objections against a bustee tenement with huts, regardless of the slightest demand at sanitation, are infinitely greater against bustees of brick buildings. In the majority of the former, the huts were only one story high, had a large court-yard open to the sky, were built of bamboo with mud-plastered walls, and could get into the rooms from innumerable doors and recesses. The sun had access to the courtyard, and its rays lessened or even prevented, to a great extent, putrefactive process set up by the

needs and dirty habits of the inmates. The bustees and areas covered with brick buildings on the new plan will not have these advantages, the houses being, at least, two stories high, many having no courtyard, and those possessing one having it contracted to the smallest limits. The effect of a pure water supply in these districts can only be palliative. No proper drainage can be introduced into such localities, and it is doubtful whether such drainage as is possible can be of any real and lasting service. All that can be done is to pull the houses down and begin again on new lines. Nothing but a Building Act on comprehensive lines can deal with this important problem, and surely and slowly convert Calcutta ultimately into a fairly healthy city. A very large proportion of the city is still in the condition of bustee land, and accordingly it is quite easy to prevent the sale of it or any other kind of land for building plots until proper streets are laid down by the owner. Roads with a minimum width of 40 ft. are absolutely essential to ensure a healthy condition of the houses abutting thereon. The general question has given rise to the most opposite opinions among the Municipal Commissioners, who are divided into two schools on much the same lines as in London and other cities of Europe, the majority holding that land to be taken for roads should be acquired at public cost, the minority holding that in the case of property in an overcrowded city interference is necessary for the commonwealth, and that the State should place such restrictions upon building, even at the cost of diminishing the value of town property, as may be essential to the public health.

SURVEYORSHIP APPOINTMENT.—At a special meeting of the Swaffham Rural District Council, held on the 17th inst., Mr. John W. B. Rooke, Assoc. M.Inst.C.E., of Brooklands, Cambridge, was elected surveyor.

GLASGOW AND WEST OF SCOTLAND TECHNICAL COLLEGE.—The architectural students attending the classes of this college spent last Saturday afternoon at Glasgow Cathedral, when Professor Gourlay conducted them over the building, explaining in detail many points which he had referred to in his lectures during the session which is now drawing to a close. Attention was also drawn to the various Renaissance monuments in the cathedral and churchyard.

AN APPEAL TO NON-UNIONIST WORKMEN.—The "Alliance Carpenters and Joiners' Protection Society" has issued a manifesto addressed to non-federated carpenters, joiners, and members of kindred trades, urging them to unite in resisting the policy of the trades unions in preventing non-union men from working with union men. The manifesto concludes:—"There are, at the present time, in London 120,000 men connected with the building trades who are non-unionists, whilst there are only 30,000 trades' unionists. Therefore, the gross injustice is only too apparent in not allowing you to work with them unmolested without purchasing a ticket, thus placing yourselves under the most abominable, hateful, and humiliating form of coercive government since the Dark Ages. Their motto is, 'take a ticket or starve'—but only take it if you wish to be free. Your will is not your own—your trade is not your own, but is at the mercy of the federation to dictate whatever terms they like, and you dare not refuse. We, therefore, impress upon you who are in the majority, to combine and resist the tyranny of those domineering few."

MEMORIAL WINDOWS, HAMILTON, N.B.—Two windows have just been placed in St. Mary's Episcopal Church, Hamilton. The subject of the first window is "The Nativity," and is inscribed—"In memory of Cecilia Cleland Urquhart." The second window, the subject of which is "Christ in the Temple at Twelve Years," is inscribed—"In memory of John Urquhart, of Fairhill." The windows were designed and executed by Messrs. Clayton & Bell, London.

LEGAL.

WOODRUFF v. MEESON.

At the North London Police-court, on the 23rd inst., Mr. Woodruff appealed against an objection made by the District Surveyor for East Hackney North, under Section 150 of the Building Act, that some bath-rooms mentioned in the building notice to be 7 ft. 9 in. high were "habitable rooms," and should be 8 ft. 6 in. high. The Magistrate decided that a bath-room was not a "habitable room."

CAPITAL AND LABOUR.

THE LONDON BUILDING TRADE.—Each of the thirty-two societies affiliated to the London Building Trades' Federation have forwarded to the headquarters of the Master Builders' Association the result of the recent balloting in their respective unions on the subject of the proposed amended working rules for the building trades in the metropolis submitted by the Association. There was a large preponderating vote in favour of adhering to the agreement of 1892, but up to the present the officials of the Federation have declined to publish the precise figures. The communications which have been forwarded from the various societies were considered at a meeting of the master builders on Thursday. The feeling among the masters is that

there is but little danger of a strike. They still maintain that the sole point of serious disagreement between the two sides has reference to the employment of non-unionists, and that the question of sub-letting does not complicate the situation in the least. On the other hand, Mr. J. Verdon, the secretary of the Federation, in the course of an interview, said the existing deadlock had arisen over the demand made by the Masters' Association to insert a new rule recognising the principle of sub-letting work. The real difficulty was not as to the employment or non-employment of non-union hands, but as to this question of piecework, which the men considered to seriously affect their interests.

PLASTERERS' STRIKE, MANCHESTER AND SALFORD.—The operative plasterers and their labourers in Manchester, Salford, and surrounding districts are at present on strike. A short time ago the plasterers, who were then receiving pay at the rate of 3*sd.* per hour for a week of fifty-two hours, made application to their employers for an advance of 1*d.* per hour, and the labourers, who were getting 6*d.* an hour, asked for an additional 3*d.* an hour. The men also demanded that what was known as the two-miles radius should be reduced to one mile. The Manchester and Salford Association of Master Plasterers and Painters—who are federated with the whole of the building trades in the country—have considered the applications of the men, and decided to concede to the plasterers an extra halfpenny an hour and the labourers an extra farthing. The masters, however, have determined not to reduce the two-miles limit, and point out that recently the operative carpenters at Manchester agreed to a three-miles boundary. The refusal of the masters to concede the demand in the matter of the boundary has resulted in a large number of local plasterers and labourers coming out on strike. The question is a small one, and ought to admit of easy adjustment.—*Manchester Guardian*.

THE MANCHESTER BUILDING TRADE.—At a meeting of the carpenters and joiners of Manchester on the 18th inst., it was announced that the master builders had conceded an increase of a halfpenny per hour, and a reduction of hours from 52 to 49½ per week, the alteration to come into force on June 1. Several minor points were left for decision by a committee representing both sides, but the employers decline any concessions as to walking-time, grinding-time, and the question of notice, otherwise than in accordance with the present rules.

STRIKE OF THE LEICESTER CARPENTERS.—There are now signs that the dispute between the master builders and the carpenters and joiners of Leicester will soon be ended. The committee of the Master Builders' Association met on the 19th inst., and considered a letter received from the representatives of the men, offering to meet the representatives of the Association on certain conditions. After careful consideration it was decided that a reply be sent to the Carpenters' Society to the effect that the representatives of the employers would meet the men's delegates upon the understanding that no conditions were imposed.

MEETINGS.

FRIDAY, APRIL 26.

Architectural Association.—Mr. C. W. Whall on "Painting, and its Relation to Architecture." 7.30 p.m.
Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—Mr. H. P. Boulton on "Scavenging, Disposal of House Refuse." 8 p.m.
Institution of Civil Engineers (Students' Meeting).—Mr. Bernard Godfrey on "Brine Pumping." 8 p.m.
Institution of Mechanical Engineers.—General Meeting (concluded). 7.30 p.m.

SATURDAY, APRIL 27.

Architectural Association.—Visit to St. Olave's Grammar School, Southwark. 3 p.m.
Incorporated Association of Municipal and County Engineers.—Lancashire and Cheshire District Meeting, to be held at Chesham.
St. Paul's Ecclesiastical Society.—Visit to Chislehurst, under the guidance of the Rev. Canon Murray. Trains leave Cannon-street at 2.30 p.m. and 2.55 p.m.
Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—Inspection and Demonstration of the Sewage and Destructor Works, Ealing. 2.15 p.m.
London and Provincial Builders' Federation's Association (Memorial Hall, Farringdon-road, E.C.)—Quarterly Meeting. Adjourned discussion on "Fast and Present Apprenticeship." 9 p.m.
Northern Architectural Association.—Visit to Billingham and Norton Churches. Conference at Stockton in the evening.
Edinburgh Architectural Association.—Visit to (1) Crichton Castle and Church; (2) to Borthwick Castle and Church.
Queen's College, Cork.—Mr. Arthur Hill on "The History of Architecture." XX. 3 p.m.

MONDAY, APRIL 29.

Surveyors' Institution.—Adjourned Discussion on Mr. G. Cadell's paper on "Forestry." 8 p.m.
Society of Arts (Cantor Lectures).—Mr. James Douglas on "Recent American Methods and Appliances Employed in the Metallurgy of Copper, Lead, Gold, and Silver." II. 8 p.m.

WEDNESDAY, MAY 1.

Royal Archaeological Institute of Great Britain and Ireland.—(1) Mr. T. J. Willson on "The Structure of the Castle at Lincoln." (2) The Worshipful Chancellor Ferguson, LL.M., F.S.A., on "A Collection of Chapbooks in Tullie House, Carlisle." 4 p.m.
British Archaeological Association.—Annual General Meeting. 4.30 p.m.

The Builder.

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ILLUSTRATIONS.

Design for the Apse Windows of Gracechurch, Utica.—By Mr. Henry Holiday	Extra-Large Ink-Photo.
New Chapel, St. Peter's College, Radley.—Mr. T. G. Jackson, A.R.A., Architect	Double-Page Ink-Photo.
Abbeys of Great Britain—XII., Bolton.—Drawn by Mr. J. A. Slater	Double-Page Photo-Litho.
Plan of Bolton Abbey	Double-Page Photo-Litho.

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Architecture at the Royal Academy.

THE Architectural Room this year contains two models of buildings, in addition to the usual drawings. What may not be hoped for from such an innovation? It is true that if this new movement is carried much further, and other architects besides the two bold innovators take encouragement to enter on the same path, the small room devoted to the representation of architecture will soon become inadequate for its purpose; the sooner the better. We have before said that if all the talk about architecture being the central art and mother of the arts were really set upon, the large Gallery III. ought to be devoted to architectural models and to drawings of architecture on a large scale. Perhaps the two models admitted this year may prove to be the thin end of the wedge. In all events, the innovation is an encouraging one.

Though the two models in question do not represent the most important buildings illustrated in this year's show, we feel bound to give them precedence. They are sufficiently different in style. No. 1,608 is an example of the highly-finished work of the professional modeller. It represents Sir Thur Blomfield's "Chapel at Tyntesfield," a work of pure Gothic in the Decorated style, and is finished within and without in cardboard and whatever other materials the professional modeller employs in his delicate work—ornaments, gargoyles, tracery, and everything complete; and is, as far as we can see, finished within and without with the minute care. We look through the windows and discern the interior details. The position of the chapel in regard to the ground is accurately shown. On the one side a high bank abuts against the building; the other side the lower portion of the building, corresponding with the banked-up position on the north side, is treated in brickwork, as distinguished from the stonework above, so as to carry round the line of demarcation formed by the bank on the south side. As may be supposed, it is a Gothic building, representing the one-chapel form, and completely satisfactory from this point of view, though not presenting any novelty of treatment.

The other model (1,509) bears the name of E. S. Prior, and is about as complete a contrast to the first-named example as could be.

It is an outside model only, illustrated never as to its internal arrangements by

small plans nailed down on the four corners of the board. It is comparatively rough in appearance, and revolutionary in its tendencies. We do not like to suggest anything so much below the dignity of "professional" architecture, but we strongly suspect Mr. Prior of having made the model with his own hands. He is quite capable of it. The design represents domestic architecture reduced to its first principles; a plan, and a covering to the plan in the shape of walls and roof; but no tricks of architectural detail or ornament. The plan is a very peculiar one. Viewed from the garden side, which is the one turned towards the room, the plan roughly resembles an inverted V. The central portion is a hall, with a small staircase in a projecting bay off it. The drawing-room and dining-room occupy respectively the two oblique wings, on the main floor. This, on the garden side, is on a level with a formal garden placed diamond-wise, and partly embraced by the two wings. Flights of steps lead down from the garden at each side to the basement level, where is the stable block on one side and the kitchen block on the other, each partially separated from the central portion by an arched passage. On the upper side of the plan the kitchen and stable-wings partly overhang, and display a kind of verandah supported on plain circular brick (?) columns. Between these is the forecourt of approach to the house entrance. The plan is a perfectly practicable one, and makes a very interesting little house. What practical objections may be urged are these. There is too much roof, the upper story being entirely in the roof. This looks very picturesque externally, but it is hardly the way to make warm or commodious bedrooms internally. Nor do we think that to have doors, though small and partly sheltered by a verandah, opening directly out of drawing-room and dining-room on to the formal garden plot before-mentioned, is an arrangement conducive to comfort in winter. But making all allowance for this, it is a most interesting and original exhibit, and one that is likely to materially aid in rendering the Architectural Room more attractive to visitors than it is generally supposed to be.

Turning to the drawings on the walls, while there are not many drawings of very large or important buildings, the impression from a rapid survey is that there is a larger proportion than usual of designs showing considerable originality; that there is a greater variety of special interest than usual. Among minor points which characterise the collection, we notice that there are at least five designs for organ-cases (one of them is

illustrated in our present number); there may be more that we omitted to notice, but we counted five: of these more in their turn. The two drawings which will catch every eye most prominently are two large water-colours on the south wall, which at a little distance, and at first glance, suggest the idea of being, the one a drawing of an Egyptian pylon, and the other the interior of an Egyptian temple (restored). They represent however, in fact, Mr. H. Wilson's idea for a new church at Boscombe (Bournemouth). *À la bonne heure!* Bournemouth has been up to the present time at about the lowest architectural level of any town we know of; as far as we recollect, except Street's church, there is not a decent building, architecturally speaking, in the place. The exterior, "study for west front of proposed church of St. Andrew, Boscombe" (1,507) derives its quasi-Egyptian aspect from the fact that the wall lines slope inwards from the ground to the top, to an extent which we should think there would be some difficulty in realising in execution with any due regard to economy of material. No plan or section is given, so that this point is evaded. There is an immense mass of blank wall, in the centre of which is sunk a deep round-arched recess with a traceried window buried in it, and a crucifix and other figures over it. Over the arch is a seated figure of Christ with some polychromatic decoration on each side, and the extremities of the mass are finished by coupled windows and shafts of a rather Lombard appearance; the vest porch seems also to remind one of Lombard Romanesque. Over the centre of the whole is a square spirelet with a kind of flat table on it, rather reminding one of the effect of the "mortar-board" of a college cap, and a small pavilion forming a finial over it. All this sounds rather *bizarre*, but really it is a most powerful and original conception, though we should like to know what is the scale of it; we should rather doubt if it is intended to be as large and imposing as it looks in the drawing. The interior (1,519) derives its Egyptian effect from the appearance of the large, lofty, dark columns, which appear, however, to be of Classic model, and the rich effect of colouring imparted by the treatment of the drawing; the view looks towards the chancel, and is terminated by a traceried window. In this drawing again there is an idea of large scale conveyed which may be an exaggeration of the actual projected scale of the building. Both drawings are splendid specimens of broad and powerful handling in water-colour, worth looking at on that account alone, and the design, whatever we may think of its practicability in some respects, is

a piece of real poetic invention in architecture.

Both Messrs. Webb and Ingress Bell and Mr. T. G. Jackson exhibit bird's-eye views of their designs for the Christ's Hospital Schools at Horsham. The former (1,511) shows very effectively the fine sweep of the range of buildings. Mr. Jackson's drawing, on a smaller scale, is not in a style calculated to do the best justice to his design, which architecturally is an admirable one; it seems to have been rather hurried in execution, and the untouched white walls with washed-in shadows look rather bare and devoid of texture. The entrance façade, with its tower over the gateway balanced by the circular turrets breaking the line of wall on either hand, would have looked very well; and the chapel beyond comes in very picturesquely to break the line of the lower quadrangle buildings, though as a matter of planning we should have preferred to see it more centrally and less accidentally placed in appearance.

Among church designs is an interesting study by Mr. Skipworth for "A Nineteenth-century Attempt at a Large Cathedral," shown in a perspective view (1,469) and a side elevation and plan (1,514). The latter is hung too high to see the plan well. It shows the same character as in the author's designs for smaller churches, applied on a larger scale and with more elaboration. The west front in the view is flanked by towers octagonal at the base, then breaking into a circular plan, finishing with an octagonal lantern of striped stone and brick, with a thin leaded spire rising above it. This is picturesque, but rather wants breadth and dignity for a cathedral. The centre tower is an octagon with a dome-like roof, and a parapet that is half Renaissance in style, though the other details are Gothic. The centre tower groups with lower transept towers which form with it a large central mass, and this massing of the centre is the most striking point in the design, which shows a great deal of cleverness.

We may occupy the remainder of this article with considering the other church designs in the room, taking them in numerical order. Messrs. Prothero & Phillo's "New Chapel, Cheltenham College" (1,413), shows the exterior of a building in the usual type of a Gothic college chapel, with nothing special to remark on in the design; the east front is richly treated, with a wide traceried window and the wall space above occupied with niches and sculpture. It is rather amusing to see the one break-out from orthodox Gothic in the Renaissance treatment of the little cupola over the bell-turret; a slight fling in the direction of freedom which seems odd in combination with the completely orthodox Gothic of the remainder of the building. Mr. Ernest Newton's "St. Swithun's Church, Lewisham" (1,414), shows the interior of a church designed on very simple lines, with heavy moulded tie-beams; the nave wall is divided up into bays by mullion-like pilasters (if they may be so called) springing from the caps of the plain octagonal piers. Considering the simplicity and solidity of the rest of the design, the tracery of the east window seems rather too "busy" in design and somewhat thin in proportions. Mr. Mitcham's "St. Saviour's Priory Chapel, Haggerstone" (1,433), is a small coloured interior in a very massive Romanesque style, with the unusual feature of a stone barrel vault into which the round arches of the arcade cut; the whole is treated with great solidity; the vault is decorated with bands of painted foliage sharply defined by boundary lines, and arranged with angular breaks in somewhat the fashion of a Greek key pattern on a large scale; whether this is the best way to decorate semi-circular surfaces may be a question; the square lines and angles of the decoration do not seem to harmonise very kindly with the curved surface of the vault; but the whole treatment is broad and massive. The exterior (1,443) is a piece of nearly plain brickwork with a stone

modillion cornice let into it for a certain distance, and terminating on itself in a rather accidental fashion; it seems like a length of cornice cut off and inserted here for no special object; there is a low tower with a spirelet issuing from the middle of it; this portion of the exterior has a character of its own. Mr. Jackson's "Ridley College Chapel" interior (1,434) is illustrated in the present number, and we refer the reader to the lithograph; the organ case is very effectively treated; the timber roof seems rather thin and wanting in mass, though this may be admitted to be in character with the general style adopted. Mr. Champneys' "Proposed West Front, Manchester Cathedral" (1,455), is shown in a geometrical elevation which we cannot admire very much; it may be described as Perpendicular Gothic freely treated; there is a highly-enriched porch with a battlemented finish, and a square mass of building above also furnished with battlements, filled with open tracery in the centre portion; at the angles are open octagon lanterns in two stages and with stone domical roofs; this is the most original feature in the design, but the whole looks rather heavy and squat. Why does Manchester Cathedral require a new west front at all? Messrs. Paley, Austin, & Paley's interior of the chapel for Christ's Church Schools, Horsham (part of their competition design) is excellent regulation Gothic, but presents nothing for remark, except the treatment of the springing of the vaulting ribs just above the cap of the vaulting shaft, which is treated with panelling stopped by a small cornice or string a short way above the springing. Is this meant as an architectural definition of the portion of the vault built as a *tas-de-charge*, that constructive device in vaulting about which Mr. Spiers propounds a question in a letter on another page? The same architects' design for the rebuilding of All Saints Church, Hertford (1,464) is another piece of orthodox Gothic, a richly treated and lofty church with a massive western tower, to which a little special character is given by the rather unusual accentuation of the staircase turret.

Mr. Norman Shaw's Church of All Saints', Swanscombe (1,467), is also a Gothic church in all its details, yet does not impress one as a mere revival of Gothic. It is a small church of great simplicity of design with a large low square tower standing over the east bay of the nave, the easternmost piers being strengthened to receive it, but not looking quite massive enough for the proportions of the tower. As there is no section, the method of construction is not shown. The tower is furnished with battlements on raking lines, forming a kind of pediment, with solid blocks of masonry at the angles; the roofs, which are high, come down low on the walls, the square-headed mullioned windows finishing immediately under the eaves. The design gives the expression of simplicity suitable to a country church, combined with solid and monumental appearance. It may be compared in this respect with the drawing of another rural church (1,489), also with a low central tower, but which wants the simplicity and massiveness of Mr. Shaw's design, and looks weak as compared with it. Messrs. Carvill and Passmore's design for the chapel for the Hospital at St. Peter Port (1,491) is another of the simple class of designs, shown in a tinted side-elevation; the chapel appears to occupy the upper story, the chimneys form the lower story running past it; the chapel is sufficiently marked by the larger mullioned windows belonging to it, and the treatment is suitable for the situation. Mr. F. Bright's sketch for a "Village Church" (1,505) comes under the same category. This is also a tinted elevation, and has rather a family resemblance to other designs for village churches which have been seen lately; to design a village church seems to be a rather favourite occupation now, and the types are rather similar; low square towers and low square-headed windows seem to be the main

ingredients. They tend to get a little too like each other.

Mr. Leonard Stokes's "All Souls' Church, Peterborough" (1,494), is a very pretty pen drawing, but presents little for remark, as in fact not much of the church is seen except the west end. Mr. Baker King's drawing of alterations to nave and new chancel for Christ Church, Southwark, an interior view (1,516), does not show us what the alterations to the nave consist in and what is original; but the chancel appears to be an addition in a Romanesque style to a classic church; we do not see the suitability of this. Mr. Horsley's drawing of the exterior of the design for a new church at Ipstones, Staffordshire, seems at first sight almost too simple a matter for exhibition, as merely the exterior of an octagon apse; but it gets character from the treatment, the piercing of only one face of the wall with a window, leaving the others plain, and the introduction of the figures of Christ and Saints in sculpture over the window. The new chancel at Edwalton Church, by Messrs. Brewill and Bailey (1,544), shows little originality except in the manner in which the figures over the roof-loft are perched on conventional branches, and the effect is a little too playful for a sacred subject. Mr. Nicholson's perspective of the new church for Cockington makes it look a good deal larger and more massive than it can really be according to scale (the scale-drawings were published in our issue of June 30, 1894), and the somewhat too assertive treatment of the tower wants toning down a good deal. Mr. Jeffery's drawing of the Anglican College, Jerusalem (1,549), a large, cleanly-executed pen drawing, is of some interest. The domain is guarded by a lofty bare wall cut into plain battlements at the top, and a gate tower of the same character, beyond which (it is a bird's-eye view) is seen a large three-aisled church with very low-pitched roofs and treated in a very plain and solid manner. Except a traceried window at the end, there is not much to be made out of it in detail, however, and there is no plan except an outline block plan.

We can only just notice Mr. Weatherley's interior of Stanford-on-Soor Church, an orthodox Gothic interior with the wall above the chancel arch covered with a painting of Christ and angels, only indicated in monochrome, however (the drawing is in pencil), and Mr. Goldie's St. Ethelbert's Church and Presbytery, Slough (1,567), a water-colour drawing of a solid-looking Gothic stone church, with which the presbytery, a secular-looking square house, does not harmonise. There remain three designs of considerable interest. Mr. Carde's sheet of drawings of St. Michael and All Angels', Colehill (1,548), shows what may be called a rural church with a low tower of which the upper stage is in half-timber work. The plan shows a church with a nave and one aisle and (apparently) iron columns; the view of the interior shows a large rather rude timber roof, giving it the general appearance of a Mediaeval tithebarn (some of these old barns would have been very good models for the nave of a country church); the font is of Classic type, a scalloped bowl on a column, with a cherub's head carved on it, while the Communion table, of which a drawing is given immediately above the font, is completely and ostentatiously Gothic, as if to emphasise matters in this respect; the pulpit also shows a kind of mixture of Gothic and Jacobean detail, but this is harmonised, the font and communion table do not harmonise, and for a position in the same church look too much as if they came from different countries or different ages. We cannot see the sense of this; there is such a thing as congruity of style. Mr. E. P. Warren's church for a West London suburb (1,562) is a drawing of an interior, with side aisles for passage only, making the nave practically a one-aisled one; there are lofty and rather thin piers of a lozenge plan, and with side caps inserted on them a little below the main roofing-caps,

m which spring the arches of the main arcade. This is all very cleverly contrived; connexion of the piers with the exterior wall by what we may call stone "bridges," do not like so much; the upper side of the arch seems to want something to finish it, the motive for not building up the space to the top. The roof is treated as a barrel vault with wooden ribs on which a simple effective colour decoration is applied, as to some painted foliage ornament in the piers between the arcade and the nave.

The exterior and interior views of the new church of St. Etheldreda, Fulham (1,559 sq. ft.), by Mr. Skipworth, are well worth attention. The exterior style of this design is not differ materially from that of one or other designs by the author which have been published in our pages; as usual, it is graceful and very original, and drawn in a very charming style. The interior shows a great deal of special treatment. It is also a one-span church. The piers project as square masses internally, with lofty semicircular arcade connecting them, but with the arches kept free from the wall so as to leave a deep shadow. The vaulting springs from corbels inserted in the piers between the parting of the arches. There is a passage kept clear of the piers by means of openings like the triforium passage openings in Mediaeval churches. At the east end is a flight of steps up to the choir, or rather a flight of steps; at the centre, and at the sides, and the main piers. The whole treatment of this portion of the church is very effective and original, but can hardly be taken apart from the drawing. We shall publish an illustration of it shortly.

We have drawn attention to the qualities of originality in some of the church designs published, because we are more and more convinced that the orthodox Gothic revival type of church is a thing of which the interest is really gone. If it is done, it is no doubt a thing that it should be done well, and with adequate knowledge, and there are two or three examples of this in the room, especially those of Messrs. Paley, Austin, and Paley. The work of these architects is roughly good of its kind, but it is a kind which the world is ceasing to feel interested in; and it is certain that success in the immediate future will attend rather on those who can infuse new treatment and suggestions into church architecture, even when mainly based on the Mediaeval model.

NOTES.

THE meeting of members only at the Institute on Monday night to consider the question of the new form of building contract, ended in an adjournment, ostensibly (and perhaps really) to give the Provincial architectural societies opportunity to study it and express their opinion on it. An attempt to refer it to the Practice Committee for re-consideration was met by an emphatic intimation that the Practice Committee would not consider it, having given every attention possible to it. With this attitude on their part we sympathise. There are people at the Institute who would pick holes in any form of contract proposed. An alternative form of arbitration clause proposed by the Institute of Builders, and which has been brought before members of the Institute generally, is one which it would be absurd to expect any architect to accept; would simply mean delivering himself over, hand and foot, to any contractor who wished to make himself troublesome. We privately told (not officially) that the cause of the Builders' objection to the Institute arbitration clause is the conviction that nothing is to be submitted to arbitration till the completion of the contract, without the consent of both parties; we are told that some architects, unreasonable, others have unreasonable clients whom they cannot control, and that

the refusal of a certificate under such influence, when it has become fairly due, may be most prejudicial to a builder with small capital. This is no doubt true, but the architect may answer that some builders are unreasonable and litigious, and that to give them the power to go to arbitration at any moment would put the architect at their mercy, and contractors must remember that the architect is properly *master* on the works, and must remain so. We were prepared to give due weight to the builders' argument above referred to, but we are inclined to think the argument from the architects' point of view is even stronger. And the Builders' Institute have now, it is to be feared, alienated many of their friends by their exceedingly bad taste in sending round a circular letter to all the members of the Institute of Architects, behind the back, as it were, of the Council, endeavouring to prejudice the case by statements as to the action of the architects which are not borne out by the facts. The feeling aroused by this ill-advised move on the part of the Builders' Institute has been very strong, and they have injured their cause by it.

THE public meeting held last week with a view to urge on the County Council the necessity for proceeding with a scheme for the improvement of the communication between Holborn and the Strand was not held too soon. The blocks which are constantly occurring in connexion with the traffic between Euston Station and Waterloo—we take one instance alone—are a cause of great public inconvenience. The sole reason why some reasonable scheme of improvement has not yet been carried out is, that the late County Council were so enamoured of the principle of betterment that they would not agree to any scheme in which this principle was not included. The late County Council, indeed, have delayed necessary London improvements, simply for a theoretical and not a practical reason. The main object which they should have had in view was the carrying through of certain work required in the public interest. If Parliament sanctioned the scheme as presented to it, well and good. If it would not agree to all the details, the work should have been done as Parliament would allow. We hope, therefore, that whatever may be the views of the present Council on the question of betterment, they will not allow them to stand in the way of urgent public improvements. From what occurred before the Committee of the House of Commons on the Tower Bridge Approach Bill, there seems some chance of a more practical spirit prevailing. That Committee has passed this Bill with the Manchester clause, as it is called, as to betterment inserted, and have rejected the alterations which the County Council wished to make in it. For the moment, the decision of the Committee has been accepted, and if it is not rejected by the Council, this troublesome question might be laid to rest.

THE state of matters in regard to the water question in London cannot be regarded as satisfactory. As we have more than once stated, the transfer of the water supply to a public body should have been effected by a Bill dealing with London and the suburbs, and introduced by the Government of the day. At present it seems probable that only two of the eight Bills promoted by the County Council will be proceeded with this session. If this turns out to be the case and the two Bills before Parliament become law, this ridiculous position would follow, that one part of London will, for a time at any rate, have a Municipal supply of water, whilst another will have the supply from private companies. On Monday last, also, the House of Commons sent a Bill of the Chelsea Company, by which that body asked legislative leave to borrow 50,000*l.* for new mains, to the same committee which is considering the Bills of the County

Council for the acquisition of the water companies. But if it is necessary for the Chelsea Company to lay new mains, the necessary sanction should be granted at once, and the Bill of the company should have been sent to an ordinary select committee. The question of the transfer of the water supply to a public body is quite separate from necessary enlargements or amendments of the existing system.

THE President of the Board of Trade has lost no time in introducing his Light Railways Bill, which was read a first time on Thursday last week. The measure is, of course, based upon the representations of the Committee appointed to inquire into the subject, and promises to remove some of the existing obstacles to the construction of light lines. Mr. Bryce estimated the cost of construction at 3,000*l.* or 3,500*l.* per mile, and stated that the average cost of constructing existing light railways was 10,000*l.* per mile. He believes that the relaxation of the requirements of the Board in regard to construction and working of the proposed lines, will induce railway companies to construct branches at their own cost, and without subsidy from any quarter. Permission is given to County Councils to authorize such lines, after examining the proposals of the promoters and submitting a Report to the Board of Trade, the latter being responsible for seeing that the local authorities do not go beyond the scope and intention of the measure. If the Bill becomes law, it will soon be seen whether there is really that demand for light railways in this country which would be inferred from the resolutions so frequently passed by agricultural and other bodies. The tone of the speeches at the first reading was not particularly encouraging, and expressed disappointment rather than gratitude.

AN important advance in autographic telegraphy has been made by Mr. Amstutz, a well-known electrical engineer, of Cleveland, Ohio, U.S.A. He has invented a sending and a receiving instrument by means of which copies of photographs can be sent any distance and reproduced at the other end in a form ready for press-printing. The importance of this invention to illustrated newspapers will be readily appreciated. These instruments can be used with existing telegraph wires, and the time required to send a copy of a photograph is only a few minutes. In the *Scientific American* a full description of the receiving and sending instruments is given, together with two excellent photographs transmitted in this manner. Both the receiver and the transmitter have a revolving cylinder with a synchronising device to govern the speed. In the transmitter there is a tracing pencil, and in the receiver a graving tool. As in a well-known method in photogravure the films for use in the transmitter are formed by obtaining a gelatine relief by exposing bichromated gelatine to the action of light beneath a negative. The film is then put on the cylinder, and as it revolves the tracer rises and falls with the undulating surface of the film. Hence, by suitable electrical devices, a varying current is sent along the transmitting wire, and a varying pull produced on the graver tool by the coil of wire that surrounds it. The graver works on a plain gelatine or wax film, which is attached to the receiving cylinder. As these cylinders revolve, in a similar way to the cylinder of a phonograph, it will be seen that a copy of the picture will be made on the receiver. All that it is then necessary to do is to electrotype the receiving film, and it is ready to be printed from. For rough illustrative work, as in newspapers, the instruments are of simple construction, and produce effective sketches. For art work they require further elaboration, and would consequently be more liable to get out of order. They can also be employed for engraving designs on gold and silver ware, the receiving and sending instruments being

placed side by side. Although the invention contains nothing strikingly new, combining as it does the principle of the telephone and the phonograph with well-known methods in photography, yet it is none the less an important advance over the older methods of autographic telegraphy in mechanical detail, as the apparatus is better able to stand ordinary rough usage.

WE understand that the new block of the Record Office will be ready for occupation by the end of next month. It has been erected on the east side of Chancery-lane by Messrs. Foster & Dicksee, of London and Rugby, contractors. The design reproduces, in the main, that of Sir James Pennethorne as seen in the old block, being all that was erected in pursuance of his original scheme (1847) for a large L-shaped building extending southwards to Fleet-street, near Fetter-lane. Mr. Taylor, of the Office of Works, is the architect of the new buildings, which are constructed, without, of Portland oolite from the Weston quarries, with Babbacombe marble for the rag-work. The north portion is being fitted for the storage of records; the south portion is devoted to the staff and office purposes. The Fawcett system has been adopted for the floors throughout, the record presses are constructed of slate and steel. It is expected that the demolition of the houses in Rolls-yard and along Chancery-lane will shortly be followed by that of the Master's House on the north side of the Chapel. That house was built in place of the old Rolls House, by Colin Campbell, at a cost of 5,000*l.* The accounts show payments of 5*l.* 18*s.* 6*d.* to James Richards, carver, for "divers trusses for door-cases and chimneys, and for enriching the cornice," 2*l.* for the "mask-head" over the "great door," and 5*l.* 10*s.* for "carving two lions' heads" and for "mouldings;" and that 44 ft. 7 in. of marble were used for some chimney-pieces and slabs, with 256 ft. of Portland-stone for the "chimney-pieces, hearths, and fire-stoves."* The Rolls House was in early times the Domus Conversorum commonly regarded as the home of converted Jews, who here found asylum under the protection of Henry III. Some extant accounts of the administration of the funds go to prove that there were inmates in the Domus long after the general expulsion of Jews in 1290; as late, indeed, as 1610. But that it was a House of Converts is denied by Mr. Walter Blott in his remarkable work, "A Chronicle of Biemundsbury," 1892. We cannot here rehearse his arguments, or correct the meanings he gives to some Latin words; suffice it to say that he maintains it formed the abode of the Jews' Justiciary and his Court, where the people of his nation resorted for converse and friendship, as well as for determination of their legal differences and adjustment of their affairs. Campbell's building served as an official residence of the Masters of the Rolls until Copley's day; it was then taken for the Master of the Rolls Court, and next, in 1881, incorporated with the Public Record Office. For the extension buildings a total sum of 65,000*l.* was voted by Parliament.

ON Friday last there was an interesting demonstration of photo-ceramic enamels, by Mr. Ethelbert Henry, at the offices of the *Photogram* in Farringdon Avenue. A rough definition of photo-ceramic enamels is that they are pictures produced by photography upon porcelain, glass, and kindred substances, which, by the aid of the furnace, become an actual portion of the surface itself, and thus are a permanent production of photographic art. Owing, however, to the few photographers who have succeeded in this most difficult branch of work, as also the difficulty and uncertainty of the process, and the delicate treatment required, the cost, up to the present, for this

class of work has been so high as to be out of the reach of the public generally. Moreover, most of the published instructions were unworkable or misleading. The object of the editors of the *Photogram* was to illustrate some simplification of the details of the process. The following is a brief outline of the *powder* process. It differs from the carbon process in that a transparency instead of a negative is used to print from. After a sheet of plate-glass has been coated with a sensitive mixture, it is dried, placed in contact with a clear transparency, and displayed in a bright, diffused daylight for about ten minutes. Upon removing the plate from the printing-frame, it is dusted with a vitrifiable powder of the desired colour, applied with a tuft of wool; after the plate is sufficiently dusted it is coated with collodion, and when the film is set it is placed in a bath of a saturated solution of fused borax (made by boiling) and water, where it remains for about ten minutes; it is then washed in several changes of filtered water. The film of collodion is then detached and turned over in the basin containing the article to which it is to be attached, being placed in the position required by means of a camel's-hair brush. The article is then dried in a current of air and placed in a tile-painter's furnace, the heat being applied gradually. The furnace is then allowed to cool, when it will be found that the film has become portion of the material. A great point to be observed is that there shall be an entire absence of dust. Some very good specimens were shown, and the process will probably be largely used in consequence of the reduction of expense and length of treatment.

THE Royal Academy Exhibition of this year will be regarded as an interesting one by the (intellectually) middle-class public, because it is full of pictures of incident, which are what they want. That it will be considered a very interesting one by artists we do not expect, though, of course, there are fine works to be picked out. Of these, and the pictures generally, we shall have something to say next week; our first concern is, of course, with the architectural exhibits. The Academy have provided a little sensational surprise for their visitors by hanging Professor Herkomer's large picture, "The Burgomaster of Landsberg with his Town Council," in Gallery VI. opposite the vista from the entrance. As the picture represents the interior of a large room with a central point of sight, and is so large that the sides of the frame are out of sight and the bottom of it close to the ground, the illusion is remarkable, and produces, on first entering, the idea that a new room has been added to the Burlington House suite.

THE "Connoisseurs' Treasures" exhibited at the Goupil Gallery include various works of Rossetti and Sir E. Burne-Jones, the latter mostly, we think, painted a good while since; among them is the charming and fanciful little "Pan and Psyche." Among the Rossettis "Monna Pomona" is a most subtle study in colour, however little we may admire the head, and the abnormally long throat, which was one of the characteristics of Rossetti's figures. Mr. Whistler's portrait of himself is interesting, also his sea-shore sketch, "Sea and Rain." The finest thing in the collection, to our thinking, is Mr. Legros' grand and powerful landscape, "View in the Pyrenees," more a large sketch, however, than a finished landscape. M. Fantin's "Pastoral," and Mr. Watts' charming little study of "The Baby" are also admirable. The collection includes some fragmentary archaic marbles, some Tanagra figurines of more than usual interest, various bits of Chinese and Japanese decorative work, and a curious drawing, much dilapidated, by Mantegna, "Figures and Animals"—one of those extraordinary medleys of scraps of classical

architecture with figures which seem to belong to another subject, which were the delight of some of the Renaissance artists.

ON Friday morning, April 19th, an impressive ceremony took place at Olympia in the presence of a large gathering of the representatives of many nations. The bust of Professor Ernst Curtius, the venerable historian and archaeologist, was formally unveiled in the local Museum, which owes its existence to his enthusiasm and untiring efforts. Professor Curtius celebrated his eightieth birthday on the 2nd of September last; but September is a month in which the most zealous archaeologists shrink from visiting Olympia: it was therefore thought best to postpone the public ceremony till the time at which the German Archaeological Institute makes its annual spring tour through the Peloponnese, a tour now joined by archaeologists of many nationalities. The bust unveiled is a copy of that presented by his friends to Professor Curtius in September last, the original adorns his house at Berlin. It is by the German sculptor E. Schaper, and is an excellent likeness, as the artist has admirably caught the aloof upward look, so characteristic of Curtius. The copy at Olympia bears the double inscription "Ernst Curtius von Freuden und Verehren Gestiftet 2 September 1894, and "Ἐπίστατος Κορίνθιος ἡ Ἐλπίς ἐκδομένης τῆς ἐκείνου ἐνθάδε ἡρώου." The large hall of the Museum, in the centre of which the bust was temporarily placed, was closely packed with spectators. The proceedings were opened by a speech by the first Secretary of the German Institute, Dr. Dörpfeld, who gave a sketch of the life of Curtius, and dwelt on his own experience when excavating under his direction at Olympia. Dr. Dörpfeld's own views are in many respects, as is well known, diametrically opposed to those of Professor Curtius—indeed the younger archaeologist has spent much of his energies in upsetting the theories of the older. None the less did he pay landing an reverent tribute to the energy and the poetic imagination which had been such a stimulus to himself. M. Kabbadias, Ephor of Antiquities, followed on behalf of the Greek Government. His address was in Modern Greek, and perhaps it is better frankly to own that some of its evident eloquence escaped us. M. Homolle, on behalf of the various non-German Archaeological Schools, offered the homage of all conjointly in a speech, the briefest of the day, but a *chef d'œuvre* of finish and neatness. Mr. Richardson, Director of the American School, spoke a few words in presenting a wreath from his institution. Professor Percy Gardner followed as representing his brother Mr. Ernest Gardner, Director of the British School. He offered a wreath from the British School in conjunction with the Hellenic Society. After some other addresses of less moment, Dr. Dörpfeld, after unveiling the bust, presented a wreath on behalf of H.I.M. the Empress Frederick, and one from Princess Sophia. The wreath from the Empress was of Athenian olive, with a sprig of laurel from Delphi, the rest were uniformly of laurel. The principal persons present adjourned to a banquet, at which, in true German fashion, no less than twenty-seven toasts were drunk.

THE NEW GALLERY EXHIBITION.

We cannot echo the opinion we read in some of the daily papers, that the New Gallery Exhibition is one of the most interesting which has been held there; indeed, we cannot at all understand the expression of such an opinion with the recollection of some of the splendid collections of portraits, to name one class of work alone, which have been seen there on two or three occasions during the last few years. There are a good many pictures of the kind which may be called eccentricities, a good many weak productions of no very particular interest, and but a few that can be called works of first-class significance or importance.

Among the latter Sir E. Burne-Jones's "Fall of Lucifer" (135), which in regard to com-

* For these items we are indebted to the courtesy of Mr. W. J. Hardy, F.S.A.

tion seems a kind of echo of his "Golden Iz," is a most remarkable work in regard to its form and decorative effect; the gate of Heaven (very realistic gate) is seen in the upper corner, the armed group of the outcast angels, unders down from it in a sinuous line, with a remarkable combination of steel armour and blue dows. It is a very striking picture in all but faces of the rebel angels, which wear the same sad and inscrutable vacancy of expression to be found in so many of this artist's figures, and which seems to be posed to suit all subjects alike. It is so much a conception of the rebel angels, as a study of colour and composition under that name. The same artist's "Wedding of Psyche" (131), is a procession of thin melancholy ladies, crossing across the picture in a single line, all with normally small heads or abnormally long legs; the centre figure of the line is nearly ten times high (we measured it with the edge of the plough). Sir John Millais' "Time the Teller" (131) is a much more robust work than any of these. This may be said to represent Time as Death, an aged figure with the conical scythe, who has deposited his hours (the sands run out) on the step of a door, the door of which he has commenced to push open, a chink of strong lamplight coming from within into the night. This is a fine and poetical work, and one can regret that we do not often see the greatest possible painter of the day in subjects that give some scope to his imagination.

His powerful and successful work is Mr. Collier's "The Laboratory" (238), in illusion of Browning's well-known and sinister poem, at the moment when the lady, taking the glass mask which she had used to protect from the fumes while the poison was being pounded, receives the deadly little phial from the hands of the old chemist. Both figures well conceived; they answer to the conception of the poet; the details are thoroughly studied; the picture is one of Mr. Collier's most successful, though not, perhaps, most pleasing; the subject almost precluded that. Mr. Langue's "In a Cottage, Nightfall" (262) is a pleasing domestic idyll, but hardly justifies the use of the canvas. Mr. F. Brangwyn has painted a large picture of St. Simeon Stylites receiving a sacrament before his death (271), a striking pathetic work; but he fails to give the up-lift of the scene; the square area of the wall on the top of the column occupies the centre of the canvas, and the houses are seen far below, the aerial perspective is not successful; we do not realise sufficiently that this is the top of the column; it does not stand out sufficiently from the surroundings. There is a fine effect of sunset over the hill, which seems in sympathy with the tragic subject of the picture. Mrs. Norton's "The Sense of Sight" (250) is one of a series of the "Five Senses" (7) is an unusual and interesting work, and a success in its kind; it shows the half-length figure of a woman's face turned upwards towards the sky and a singularly eager and bright look in the eyes quite answers to the title of the picture. All this artist's works, it is painted in a very broad style, and with a very fine sense of colour.

Mr. Tadema's central work, "Love's Jewelled Ring" (73), a Roman girl showing her ring to her, is to some extent a representation of a happy combination; a terrace, a mass of azaleas, a white marble pilaster in the rear; the landscape seen on either side of it. Mr. Tadema is never careless, and never slurs anything, over, so that his works maintain their level of technical sense, but the picture has even a point or subject than usual with him, and the details comprising it are not so effectively suggested as in many of his works. His other contributions lead us into portraiture; "Mrs. Land Hill and Children" (67), and "Mrs. G. Simonds and Family" (79) are portraits of groups of heads with only just space for a background between the lower and upper rail of the picture; the result is rather awkward; they seem uncomfortably squeezed in. "Mrs. Simonds and Family" includes Mr. Simonds, of an excellent likeness is given. Among the larger portraits of the year Sir E. Burne-Jones contributes a curiously coloured one, "Lady Windsor" (119), a kind of study of greys, the lady standing in front of a doorway, the surroundings of which are greyed wainscottings, her dress in a similar subtle key; the figure is statuesque, sad, and silent in vitality as a portrait. No one can say of Mr. Sargent's portrait of "Miss Rehan"

(199), which has vigour enough, and is almost flaunting in effect; in a pictorial sense it is rather too great a mass of white. Mr. Holman Hunt contributes a portrait of "Miss Gladys Holman Hunt" (194), of which those who know the same artist's previous productions in life-size portrait will be able to frame for themselves a pretty clear idea. It shows the same extraordinarily realistic painting of all kinds of detail without any harmonising element, so that the picture appears to be a number of patches of different substances put together like a mosaic; and the same singular views as to the colour and texture of flesh which have been exhibited in other portraits by the same hand; remarkable works in a sense, no doubt, but representing an attempt at the impossible in painting, over which a great artist has wrecked his genius.

As usual, landscape painting at the New Gallery takes the form, for the most part, of studies of special effect rather than of landscape in its every-day aspect. There seems to be a leaning towards misty and undefined effect even among those who in general are more robust in their style, as in the case of Mr. East, whose large picture of "The Misty Mere" (225), hangs at the end of the north gallery. The New Gallery atmosphere pervades the work. Mr. Hennessey tries "Winter Twilight" (40) with success; Mr. Wetherbee paints "Summer" (249) in a tender haze, with a nymph-like figure seen at the edge of a pond in the shade; in his other work "A Sleeping Mortal" (110) the nude water-nymph, who stands up in the middle of the pond, is so thoroughly like a middle-class female of ordinary type as to make the whole thing ridiculous; it suggests the idea that the village schoolmistress had lost her clothes while bathing, and was trying to steal home by night unperceived. Mr. Hartley makes a good attempt to represent the effect of snow and frost on a winter's night. Mr. Logsdail gives a view—an elevation one might call it—of the sea-front of Venice (71) under a very bright sun and blue sky, giving its reflection to the water, the result being a very bright and sparkling aspect of the city. Mr. Laidlay's "Counting the Flock" (35) and Mr. Orrock's "Stake-nets, Holy Island" (95) are interesting studies of landscapes of which the subject is almost nothing, the treatment everything.

Among landscapes that are more in the beaten track are Mr. Hemy's solid painting of a city seen from the river (7), Mr. Thorne Waite's "Strayed Cattle" (210), and Mr. Adrian Stokes's "An Avenue in the Marshes" (253), not one of his most impressive works however. Mr. Nettleship, in "Evensong" (30), gives an admirable study of a lion having his evening nap. In "The Pigeon's Resort" (133) and "Varenna" (137), Mr. Formill, who has come into notice in London lately as a designer of sgraffito decoration for houses, shows also that he can make effective drawings of picturesque architecture.

The sculpture is not of very much interest as a whole. Mr. Onslow Ford exhibits a bronze version of a beautiful bust which was seen recently in marble at the Royal Academy, and Mr. Albert Toft is very successful in a bas-relief head of "Miss Burnett" (427); he exhibits also a statuette under the title "Evening" (439). Mr. Drury, Mr. Pomeroy, Mr. E. R. Mullins, Mr. Frampton, Miss Rope, &c., are among the exhibitors; but none of them exhibit works of importance.

LETTER FROM PARIS.

THE two great Salons are now open, and the exhibition of the Pastellistes at the Georges Petit Gallery, which has recently opened, is in consequence nearly empty. The exhibition is a poorer one than many of its predecessors. Except M. Lhermitte, who remains always the sound and vigorous painter of rustic nature, the Pastellistes are not showing much progress. The portraits and studies of M. Gervex are like chromolithographs; M. Besnard fatigues the eyes with his violent fantasies in colour; while M. Dagnan-Bouveret, on the other hand, exhibits only works almost destitute of any colour at all. The landscapes and architectural subjects by M. Nozal, who interprets well the scenes of the South of France, and the portraits by Mme. Breslau are worth attention. In the same establishment Mlle. Louise Abbéma exhibits her new works, paintings and water-colours, of bright colour and great freedom of execution, the flower-pieces especially.

* To their contents, we shall, as usual, devote a separate article.

There is little to say about the "Independants," whose exhibition has also served as one of the preludes to the opening of the large Salons. Their exhibition, formerly in a modest booth at the Tuileries, has now taken up its quarters in the Palais des Arts Libéraux, where the walls are occupied with about 1,500 eccentricities, the majority of them not worth a moment's attention.

The work of installing the museum of the Paris Municipality in the pavilion at the Champs Elysées is in active progress. The whole of the large nave has been repainted, repaired, furnished with heating apparatus, and has been divided up by partition-walls into small galleries where the works exhibited can be classed according to their nature and date. On the left are arranged all the sketches of competitions and commissions (in painting and sculpture) intended for civil edifices; on the right, all those having relation to the decoration of churches. The first intermediate avenues are dedicated to sketches of works executed in the new Hôtel de Ville and to some few vestiges of the old Municipal palace. There are among others a series of sketches made by Eugène Delacroix, the authenticity of which—or of some of them at least—has however hardly been sufficiently demonstrated. The other rooms are reserved for historical portraits and sacred pictures from various churches in Paris, among others a very fine painting of the birth of the Virgin by Restout, a picture by Léon Coignet, the "St. Vincent de Paul" of M. Bonnat (one of his best works), the "St. Bruno" of M. Jean Paul Laurens; and lastly for the works purchased every year from the Salon. All this, however, can only be a provisional installation, if the Palais de l'Industrie is to be demolished in three years, and the Pavillon de la Ville also, in view of the 1900 Exhibition. It may be observed here that the demolition of the Palais de l'Industrie, decided on by the General Committee for the 1900 Exhibition, will probably arouse some very sharp opposition on the part of the Municipal Council. The fact is that this building, of which the State seems inclined to dispose as it pleases, is really the actual property of the Corporation of Paris. The latter, in order not to make difficulties, has always allowed the State Government to dispose of the building for various exhibitions, artistic and other, without raising any question of rent. But the moment the first beginning of its demolition is made, the Municipality will probably assert its rights, and refuse its consent to the destruction of the building, as well as of the Pavillon de la Ville, except on the condition that the State, as an indemnity, shall erect a special building for the Municipal Museum, of monumental style and sufficiently large to accommodate an artistic collection which is increasing year by year.

In the last number of the *Builder* mention was made of the decision of the Jury of Sculpture at the Salon in regard to the monument to Emile Augier submitted by the Duchesse d'Uzès. Thanks to the lady's influence with the Press and the Administration, the monument, refused admission within the Salon, has been set up outside, opposite the east doorway of the Palais de l'Industrie. The result proves that the jury were quite right to be inflexible. Whether the work was or was not really executed by the lady who claims it as hers, it is a poor concern, with no artistic merit, and quite unworthy of the premium which the Municipality of Valence has awarded to its author.

M. Dalou, who has sent nothing this year to the Salon of the Champ de Mars, is just putting the finishing touches to a monument which will shortly be erected at Batignolles, in the Square des Epinettes, to the memory of Jean Leclaire, the well-known institutor of the system of participation in profits by the workman; and who, commencing life himself as a workman, rose to be the head of a great house and an important reformer in regard to the relations of capitalist and labourer. M. Dalou represents Leclaire standing and holding out his hands to an artisan whom he seems to wish to draw towards him. The group is raised on a pedestal designed by M. Formige, the architect.

Another important monument, that to Corot, is to be erected in the Parc Monceau, and is announced to be inaugurated on June 28, 1896, the centenary of Corot's birth. The Committee have selected M. Henri Cros as sculptor, and it is proposed to organise an exhibition of the works of Corot in the Musée Galliera, to celebrate the occasion.

A rumour that the ancient Church of St. Pierre at Montmartre is in a dangerous state proves unfortunately to be true. It is asserted that there is an intention to replace it by a new building, which, it is to be hoped, is incorrect. St. Pierre

at Montmartre is one of the most interesting Medieval monuments in Paris. Along with St. Julien le Pauvre and St. Martin des Champs, it is one of the few edifices in the Early Gothic style still surviving in Paris, and its disappearance would leave a great gap in the historical documents of French architecture. If the building is really in a dangerous state, it must be perfectly possible to strengthen and repair it, without the alternative of destroying one of the most interesting pieces of ancient architecture in Paris.

We have in a previous letter referred to the necessary repairs and restorations to the Church of St. Eustache, to be carried out shortly. The repairs, which, it is estimated, will cost about 600,000 francs, will be mainly required on the southern façade, which faces the Halles Centrales, and which has already been exposed to two serious misfortunes. It suffered from a fire in 1849, and it was when carrying out repairs after this disaster that the late M. Ballard discovered the mural paintings attributed to Simon Vouet, which had been whitewashed over in the reign of Charles X. The southern façade suffered still worse during the retaking of Paris after the insurrection of 1871. The architect then employed, Radigou, was cramped in his operations by insufficient funds, and a more thorough repair has to be carried out this year under the direction of M. Gion.

The jury of the École des Beaux-Arts has given its award for the Chenavard Prize. The first prize, in the section of Architecture, has been awarded to M. Bessard, pupil of M. Pascal: the second to M. Chiffolot, pupil of MM. Daumet and Esquié.

We have already referred to the death of Paul Chenavard, at the age of eighty-seven. He had for a long time retired from active work, and many believed that he was already dead. He was a native of Lyons, and studied under Hersent, Ingres, and Delacroix, and after a considerable stay in Italy, came to Paris and exhibited his first important picture, "Luther at the Diet of Worms." He subsequently painted the "Vote on the Death of Louis XVI.," which, after being exhibited at the Salon of 1833, passed successively into the collections of M. Thiers, then of M. Ledru-Rollin, and finally of Prince Napoléon. Being commissioned by Ledru-Rollin in 1848, to decorate the Panthéon, he undertook a series of historical pictures which are now to be seen at the museum at Lyons, and some of which figured in the 1855 Exhibition at Paris. These compositions deal with the history of civilisation "from Genesis to the French Revolution." At the Luxembourg there has been exhibited for twenty years a large symbolical picture by Chenavard representing "La Fin des Religions"; this picture was in the Salon of 1869. The gods and goddesses of mythology are represented as overthrown by thunderbolts, and in attitudes somewhat recalling the figures in the "Last Judgment" of Michelangelo, and the figure of Christ moves triumphantly over the overthrown deities of Paganism. This picture, formerly much thought of, is painted in a uniform grey tone which is very disagreeable, and the attitudes of the figures are melodramatic and violent; the whole thing is a kind of Michelangelo at second-hand. There is energy and learning enough in the composition, but no real originality.

The old artist, who was an intimate friend of Delacroix, was all his life a dreamer, possessed by a chimerical idea of making art the interpreter of every branch of human knowledge. He sacrificed to "philosophy" the charms of colour, which he regarded as beside his purpose. He was inconsolable for the collapse of his great scheme, when Napoléon III. gave over the Panthéon to the Catholic ritual, and retired to an atelier in the provinces to occupy himself with his mystic aspirations and recollections of his past ambitions. He was not without official honours, having been created officer of the Legion of Honour in 1887, and corresponding member of the Académie des Beaux-Arts in 1855. He had already given his library and nearly 40,000 engravings to his native town, Lyons, to which also he has left all his fortune, to be applied as a fund for the relief of aged artists.

The death is announced, at the age of seventy, of the painter Alexandre Thiollet, a pupil of Drolling and Robert-Fleury. He had exhibited every year for fifty years. He commenced with landscape, then took to sea-pieces, and in his later years betook himself to painting views on the banks of the Seine, remarkable for their bright and atmospheric effect.

The Société Centrale des Architectes has just settled the programme for the Congress of Architects, which will be held this year from the 9th

to the 15th of June. The 9th will be devoted to a visit to Angers; the 10th to the journey from Angers to Bordeaux, where the remainder of the meetings will be held, including excursions to St. Emilion, La Montagne, and Libourne. On Thursday, the 13th, the usual banquet will take place, and on the Friday the Metropolitan members of the Congress will return to Paris. On Saturday, the 15th, will be the distribution of "récompenses" in the Hémicycle of the Ecole des Beaux-Arts, followed by a closing dinner in the evening.

THE ARCHITECTURAL ASSOCIATION.

The ordinary fortnightly meeting of the Architectural Association was held on the 26th ult. at the Meeting-room of the Royal Institute of British Architects, 9, Conduit-street, Mr. E. W. Mountford, the President, occupying the chair.

The minutes of the previous meeting having been read and confirmed,

The junior Hon. Sec. (Mr. Banister F. Fletcher) moved a vote of thanks to Mr. L. Shulfrey for entertaining the members to tea at the Spring visit to St. Peter's Church, Ealing, on March 30, and to Mr. G. Montgomery for conducting the members over the Building Trades Exhibition on April 3.

The vote was unanimously accorded.

House-list for next Session.

The President drew attention to the fact that Mr. Pite had commenced his lectures on "Modern Design," and that there was still room for members. He then read the committee's nominations for the house-list for the next session, as follows:—President, Mr. W. D. Caroe, M.A.; Vice-Presidents, Mr. G. H. F. Pryne and Mr. F. T. W. Goldsmith; Committee, Messrs. J. Begg, A. Bolton, A. C. B. Booth, A. W. Earle, O. Fleming, C. de Gruchy, F. G. F. Hooper, the Hon. A. McGarel Hogg, W. B. Hopkins, H. Huntly-Gordon, G. A. Lansdown, Theo. Moore, E. W. Mountford, A. B. Pite, H. A. Satchell, W. H. Seth Smith, E. H. Sim, and E. Woodhouse; Hon. Treasurer, Mr. H. W. Pratt; Hon. Librarian, M. J. W. Stonhold; Hon. Secs., Mr. B. F. Fletcher and Mr. A. H. Hart; Hon. Solicitor, Mr. W. H. Jamieson; the Hon. Assistant Librarians, Mr. C. H. Freeman and Mr. E. W. M. Wonnacott; Hon. Auditors, Mr. E. H. Sim and Mr. F. G. W. Buss; Assistant Secretary and Registrar, Mr. D. G. Driver.

The senior Hon. Sec. (Mr. F. T. W. Goldsmith) announced that the nomination of officers of the Association would take place on May 10, and read the by-law relating to the subject.

Mr. Whall then read a paper on "Painting and its relation to Architecture," which we print, with some omissions, on another page.

In the discussion which followed,

Mr. Halsey Ricardo, who proposed a vote of thanks to Mr. Whall, said he should like to allude to one or two remarks on which the reader of the paper laid great stress; but which, although perfectly true and meriting the sympathy of all present, required some caution in the application. Mr. Whall talked about the pursuit of beauty. Beauty should be the outcome, not the aim, of one's work. The measure of beauty was the quality and strength of the artist's passion in his subject, and it was the fire of his passion that burnt into beauty—the passion of the Gospel he had to deliver. Moreover, beauty was a Proteus, always changing its colour and its shape. It was the privilege of the artist to create new canons of beauty. Every fine piece of fresh work added something to the area of appreciation and enlarged the definition of beauty; and a man who went for producing a piece of work with his whole heart would, he thought, let the question of beauty rather take its chance and be content to assume that a beauty would come from the fervour of the painting, which would in after time be recognised as beauty, though perhaps at the actual time the epithet might be withheld or repressed. There were many instances of work that, on their production, were condemned for their want of beauty, that were now considered as classical, true inheritors and transmitters of the sacred lamp. He had been listening the previous evening to the overture to Tannhäuser, a piece of music which was written in a kind of white-hot of fury against the accepted, and so far the only known, standard of beauty in that day. It was now, he thought, beautiful then. Tried by competent and liberal-minded men, it failed to meet the test. It was produced in Paris, and pronounced by the musicians there as bad art; while Berlioz, who was working in much the same direction, pro-

nounced it such a mass of cacophony that it deserved to be hissed, as it was.

Subsequently it was performed at Düsseldorf, and Schumann, who went with an open mind, and who embodied intelligent and enthusiastic appreciation, after listening to it, gave it as his deliberate verdict that although the composer had apparently a great deal of dramatic feeling, and showed unusual power over the orchestra, still the writing was intolerable to a cultivated musician's ear. Then there was the stress laid on technique. Mr. Whall quoted a grotesque pronouncement from the *Studio*:—"Complete mastery over materials is, after all, not everything—in fact, from the artistic point of view, work only begins then." Most people scarcely dare hope to attain to a little bit of mastery, before they died—not earlier. It was natural for a painter, always striving to improve his methods, to say that this was the one thing a painter had to do, but he (the speaker), as an outsider, rather doubted the value the painter put upon it. If one thought of the pictures that had modified the world's history—so tinged our globe so to speak, that we could never look upon it of the same colour again—one might question that part that technically-perfect pictures had played in the process. If one may trust Browning, the painters themselves had their misgivings. André del Sarto, "the faultless painter," thus sadly estimates his life: "All is silver-grey; placid, perfect is my art." He names his rivals, whose he could surmount both as regards the laying-out of their colour and the correctness of their drawing, "but themselves, I know, reach many times a Heaven that is shut to me." The man whose work (in the speaker's opinion) had affected the world of painting most markedly—of late times—was Blake, whose imagery, conceptions, as painting, had sunk into men's minds, opening out unthought-of avenues of development at travel. Mr. Whall had instanced Albert Moore as one who had gone for beauty and technique. And the result? After a course of his pictures one comes away cloyed, with a general impression that one had been passing one's time in company with a parcel of girls who had begun the day grossly oversleeping themselves, had next spent what appetite they might have had for breakfast by indulgence in toffee and caramels—it was not eleven o'clock and they did not know what to do. Fancy having to live surrounded by representations of acute boredom! One should want to consider not merely what a picture was intrinsically, but what power of wearing it had. Pictures which those who were to live with it. Pictures which in an exalted key of fervour or emotion were suitable for occasional attention—as in churches, public halls and council-rooms—whilst for everyday intercourse one wanted something that had more of the elements of suggestion in it. After visiting the Stanze at the Vatican, the speaker came away with the feeling that notwithstanding the many excellences of the frescoes, they would be dreary and exhausting rooms to live in. Indeed, he was nearly rashly coming to the conclusion that frescoes were not companionable things at all, and unfit for private life when he came upon the chapel in the Riccardi Palace at Florence. Much of one's sensation there were due, doubtless, to the splendour of the colour on those walls, but something was contributed by the subject of the paintings. As matter what the weather was, what the clock, the thermometer said, as long as there was light enough, or whether one was tired or fresh, one there stepped past the ivory gate into the world of beautiful dreams and spent long hours in the very finest company, traversing, hand-in-hand, the enamelled meads of the Ideal. There were never hands painted with such passionate pleading as them, as in Millais' "Huguenots"—nor such divine kiss given as by the angels to the shepherd in Botticelli's "Nativity of Christ" in our National Gallery; yet neither of these men were comparable to Veronese in mastery of the pencil. Thinking over the kind of picture one would wish to live with, the element of repose presented itself. Perhaps unduly, at present, to us in the nineteenth century, because we lived at such high pressure, and amongst so much fever and fret, we overestimate the value and peace in these stirring times. How much of the charm of Veronese's "St. Helena" came from the beautiful repose of the picture! Another element, which appeals to some measure, possibly, to the picture being—Mr. Whall told them—left unfinished. Mr. Whall's splendid paper he wished merely to supplement by saying that beauty and technique, though things to be desired, should not be pursued for themselves directly, remembering that

table of the man who hugged his own soul to
ve and develop it, and found, in the after-
bird, that he had preserved, as the result, the
arrant of his own damnation—whereas the man
o heedlessly spent his soul in eager service of
e cause of humanity, found it again, waiting for
to, and rejoined it for evermore, in Paradise.

Mr. H. H. Statham remarked that Mr. Ricardo
d partly led up to the point which he was
bring forward. In the paper, with which he
tially agreed in sentiment, though not always
opinion, there had been rather too exclusive a
n taken of painting as a decorative adjunct to
chitecture. Whenever they used painting as a
decorative adjunct to architecture they must
chitecturalise it, not only in line, but even in
bject and expression. They could not have too
est realism or vivacity in a fresco which was to
in part of the architectural decoration; but he
d not agree with Mr. Whall that the cabinet
cture was dead. It seemed to him there was
something to be expressed in painting which they
uld put into a cabinet picture, but which they
uld not so well paint as an architectural
coration, and what he wished to urge was
at there were two sorts of fallacies about
the objects of painting. There was the Philistine
lacy, and the artistic fallacy. The one idea
as that a picture was only to tell them a story—
st people only wanted to know what a picture
s about—and the other, that the only object
a picture was decorative beauty. The latter,
its way, was almost as false as the former, and
e result of it was that painters were losing the
wer of indicating character in the way they had
merely done. He wished to draw a contrast.
few years ago he noticed a picture at the
rington House Loan Exhibition by a
deceased master of the British school,* New-
h; he was not a very great artist; he no doubt
nted some very weak pictures. This, how-
er, was an entirely successful picture; it was
an illustration of a scene from the "Vicar of
akefield," the return of Olivia to her parents,
and he was so carefully studied from the story that
the names in the catalogue were required for a
ment. They could see the Vicar, the little
children, and other characters perfectly made out.
en a good while ago there was an exhibition
Bond-street of pictures by an eminent artist,
so had been knighted—pictures illustrating
oit and his country, the "Waverley Novels."
e of the first things he saw there was "Miss
ia Manning." This was a picture of a very
otch girl, with very red hair and high cheek-
bones. The fact was that Julia Manning was a
tinctly English girl, and was described by Scott
having piercing dark eyes and jet-black hair,
d aquiline features. The painter could never
e looked at the work which he professed to
ustrate, being quite satisfied with producing a
dy of a woman, and giving it the requisite
me. They would even find that Sir E.
rne-Jones, who was a great decorative artist,
d, no doubt, something more, often fell short
the intellectual conception of his subject.
ke, for instance, "The Days of Creation."
at was one of the most beautiful decorative
ctures—the drawing and colouring were
utiful—but as a conception or symbolic rep-
entation of anything so great as the creation, he
e speaker) called it a thing for a child's
nday picture-book. The same artist had
ustrated the story of the "Sleeping Beauty,"
dently taking Tennyson's reading. The very
int of that poem was the contrast between the
eppiness of the palace and the joyous youth of
the prince who came to break it,

"A fairy Prince, with joyful eyes,
And lighter-footed than the fox,"

But Burne-Jones' Prince was devoid of spirit;
melancholy personage. Then again, he had
nted an illustration of Browning's "Love
ong the Ruins." The very point of that poem
s the contrast between the intense vitality of
e young lovers and mouldering ruins among
hich they met. The Burne-Jones lovers were
e mouldering as the ruins—they were dead
eep; he had missed the whole point of the
em, though he had produced a beautiful decora-
tive picture. That was what an artist was in
nger of at the present day; when in the
sult of pure beauty he lost what, after
ing was a still higher function—that was,
ing them an intellectual idea, either one
ung from the artist's brain, or else giving
m a new and more vivid idea of some book
history, which we could only partly realise
selves. That, he considered, was where
e artists failed—all except Mr. Orchardson,
o seemed to be the one man of the present day

whose pictures were not only beautiful as works
of art, but were also what Matthew Arnold said
poetry ought to be: "a criticism of life." They
were pictures which represented some of the pathos
and character of human life, and not merely
beautiful pictures without any expression at all.
In reference to the contrast which Mr. Whall
had drawn between Albert Moore and Pettie* he
(the speaker) was a great admirer of Albert Moore
up to a certain point, but the impression left after
looking at a number of his pictures was certainly
that they were pictures, very beautiful in colour
and design, of people with no human character
whatever. The faces were beautiful but they had
no expression, and surely expression and character
were the highest objects of painting, and that,
he thought, was where the decorative theory
might come short. The cabinet picture, in which
they were entirely free from any necessity of
considering the surroundings, ought to have
something of the interest of human life in it;
and that really went higher than merely decora-
tive work; while in a decorative painting on a
wall, which was to form more or less part of
the architecture, beauty of line was the first
thing to be considered, and human character
must be kept a little in the background, as it
were, in order to give the work the repose nec-
essary to harmonise with the architecture. Both
were equally valuable in their way; why run
down the one merely because it was not the
other?

Mr. E. S. Prior considered that in the remarks
of the previous speakers there was a film of doubt
cast over Mr. Whall's propositions, which was
largely due to their interpretation of the word
"beauty." Mr. Whall had certainly given them
a great treat, and his paper was one for reflection
rather than for discussion in that room. He
gathered from the writer's definition of the art of
painting that its sphere lay in the noblest emotions
and not in the intellect; that a work appealing
to the intellect would be something fascinating at
the moment, something transitory; but to be a
permanent work of art it was necessary to appeal
to the noblest emotions—he would even say
moral emotions, because the noblest emotions
were connected with their moral nature. In
this he quite agreed with Mr. Whall. He
was particularly pleased with the suggestion
that painting might be put on such
a reasonable and broad basis as being a handicraft
applied to the purpose of beauty, and this made
him think whether they could not say architecture
was an art on the same lines. It was a handi-
craftsmanship of design, which it was in them to
employ for the creation of beauty. The claim of
architecture to be an art was sometimes based on
its being the mother of the arts; but if that was so,
she had turned off many of her younger children
and left them to starve, while the elder children
had broken loose and got into bad company, and
only spoke of the mother to slang her. He did
not think in the present day architecture could
claim to be an art as the mother of the arts, nor
could he think with Mr. Whall that architecture
was an art because it could act as a drill-sergeant
to what he (Mr. Whall) called the accessory arts.
That gentleman seemed to infer that a student,
by spending a fortnight at the anvil, would acquire
command of that craftsmanship. Architecture was
an art because it had a craftsmanship of its own
which was employed in the service of beauty.
What was the craftsmanship of the architect?
It seemed to him there were realists and idealists
in architecture, as well as in painting, the idealist
being called an art architect, and the realist a
practical man. The craftsmanship of the idealist
consisted in his skill in the styles; that of the
practical man consisted in brains. Architecture
seemed to him to be a creation unconditioned
by either. It was sometimes said that architec-
ture differed from painting and sculpture, because
of a third thing, utility. But there was a third
thing in painting. There were the canvas and
paint. The means were made by the architect,
and were just in the same position to his art as
the canvas and paint were to the painter; they
were what the art was founded on. In a word,
architecture was a craftsmanship aiming at beauty
in creation.

Mr. G. Fellowes Prynn seconded the vote of
thanks to Mr. Whall for his admirable paper.
Speaking as to the application of decoration to
architecture, he said he could not help feeling
that much of the shyness of the public in taking
advice, either from the painter or the architect, in
the decorative work in their churches and other
buildings was because of the fearful failures that

* This refers to a point in the latter portion of Mr. Whall's paper, which we have not been able to find space for this week.—Ed.

existed. These failures were attributable princi-
pally to the lack of knowledge in the architect as
to comparative value of colours in the first place,
and secondly to the want of sympathy of painters
with real architectural decoration; he alluded to
the craving to get an immense amount of colour,
and to the want of knowledge of the way in which
colours contrasted and harmonised with one
another. This was a matter they could, with great
advantage, study more in detail than they did.
He fully agreed with Mr. Whall's suggestion that
an architect should build up what he designed,
just as painters tried to see all round their
subjects thoroughly. Architects would derive
considerable advantage if they did more in the
way of modelling. The very fact of always
designing with black lines upon glaring white
paper was a bad training for the eyes for colour;
he recommended the use of a blackboard and chalk,
and sometimes tinted paper. In conclusion, the
speaker expressed the opinion that the more they
got into sympathy and touch with painters and
painters with architects, the more likely were
they to succeed in their work.

The vote of thanks was heartily accorded.

Replying upon the discussion, Mr. Whall said
the additions made by Mr. Ricardo appeared a
little antagonistic at first sight, but that perhaps
was because of certain of his (the speaker's) views
having been badly expressed. In fact, Mr.
Ricardo's criticism, speaking generally, ran rather
with what he was thinking than with what he had
written. He did not, however, agree with the
remark that Raphael's pictures were exhausting
if they were looked at in a moment of perfect
repose. In dwelling upon the question of
technique, he was only speaking of it as a neces-
sity in the case of an ideal perfection of painting.
But he thought [he made it perfectly clear that
works of art, at any rate to himself, might have a
very great charm which still failed in rising to that
standard. If they talked of painting they must ask
themselves what was the essence of the art. It
might tell a story, but that was not the first thing;
it might raise the emotions, but that was not the
first thing—it should be a painting. He would
call the pictures to which Mr. Ricardo referred,
bracing rather than exhausting. They aroused a
certain amount of thought, which might be
exhausting, but thinking on high things was
bracing, if they were not already exhausted by
going round the Vatican in one day. He quite
agreed with Mr. Statham's remark about repose.
All paintings in association with architecture
should have that quality, and that was why he
said that the cabinet pictures of the present day
did not fulfil architectural requirements; they
were so destitute of repose, and went so
much for excitement. Mr. Statham said that
a cabinet picture was one thing, and architectural
decoration another, and that they both had their
raison d'être. Perhaps so, but when one was
speaking of painting in relation to architecture,
he considered it from that point of view
only; and if it were to be in a house that
he lived in it must have that quality of repose.
Even if the subject were in itself exciting, it must
be so modified in treatment that it should not
always jar him to look at it. Mr. Pryor seemed
to think his (the speaker's) idea was that if an
architect spent a fortnight at the anvil it would
make him a sort of drilling-master, to bring all
the arts into line. What he said was that it
would give him sympathy with the crafts which
the architect directed. It was because of a want
of sympathy with the crafts that architects so often
misdirected them. The more they had of that
sympathy the better, and he did not think it
would increase the feeling that they were
generally ordering people; on the contrary, he
thought it would modify it.

The proceedings then terminated.

ARCHITECTURAL ASSOCIATION.—DISCUSSION
SECTION.—The eleventh meeting of this section
was held at the rooms of the Association on the
1st inst., Mr. W. Henry White in the Chair. A
paper was read by Mr. John Begg, A.R.I.B.A.,
on "The Client's Point of View." The discus-
sion was opened by Mr. J. Douglas Scott, and
continued by Messrs. Satchell, Max Clarke,
Brodie, and Stockdale. Mr. Paul Waterhouse,
M.A., the special Visitor, summed up the discus-
sion, and hearty votes of thanks having been
passed to the author and to the special Visitor,
the proceedings terminated.

NINETEENTH CENTURY ART SOCIETY.—Wednes-
day, May 8, has been appointed for the reception of
works of art intended for the Summer Exhibition
(the thirty-fourth) of this Society, at the Conduit-
street Galleries.

PAINTING AND ITS RELATION TO ARCHITECTURE.*

AFTER recapitulating the substance of what he had said in a previous paper read at the Association, Mr. Whall proceeded to consider the subject from his present point of view, as follows:—

The question of the relation of painting to architecture is the question of the relation of all the other arts to architecture; not only those which have been, somewhat foolishly, singled out as "fine" arts, but all arts; and therefore, remembering our definition of art, all crafts, however humble, which set before themselves the pursuit of beauty. I think, perhaps, it will be useful before turning our attention to so complicated a thing as painting to spend a few minutes in looking at the question in a much simpler form by considering one of the lesser crafts over which architecture extends its direction.

Take metal-work, or, not to throw so wide a net, take iron-work; and consider how completely the virtue, proper to each of its two great processes, governs the design and decides its relation to architecture, both as to pattern and place. Do you think that an architect who, as part of his training, had spent a fortnight at the anvil and another at the modelling bench would ever after misapply iron, use cast for wrought, or wrought for cast? What achievements then we might have if he, with this technical knowledge himself, was able to look round him upon a band of craftsmen, each a specialist and each an enthusiast in his own craft; and mind you, gentlemen, these two things depend on each other to a great extent; it is your technical knowledge as much as anything else, that will produce these enthusiasts, for it will bring you into touch with the craftsmen and give you and them that most vital strength which comes of sympathy. That "fortnight at the anvil," besides the training that it would give to you, would (and this would be its chief value) be a hand of comradeship held out to every hammer-man in the country, and his craft would become, in the sense of fitness and sympathy, more architectural, in proportion as your architecture became more craftsmanly.

Nor would this be all, for I feel certain that, whatever craft you selected to learn as a specialty, it would not only give you the mastery which I am describing with regard to itself, but would give you, much more than you can imagine unless you have tried it, the key to the question as regards all the rest.

We have now come face to face with our special subject for this evening. For the intelligent, right, and perfect use of material being at the root of all true schools and styles of art, and each craft only attaining its proper dignity and perfection by being thoroughly itself, it naturally falls to us now to examine the art of painting in the light of these reflections, and consider what are its peculiar technicalities, attributes, and virtues.

A very large and very difficult subject, gentlemen, at any time, and one of which a single lecture can give but the barest and the baldest outline. How much more so in these days, when we are told by the President of the Royal Academy (in his speech at a recent Academy banquet) how deeply we must be struck with "the vehement and almost feverish strife of conflicting theories and opinions which is rife about us!"—a description not overcharged.

I hope you go to picture galleries. I hope you go often. You will soon have them thrown open to you in lavish abundance, and I will speak my few words now with the view of your being able to use them as a sort of guide which may give you some small help in steering your course amongst the conflicting schools and systems.

First, then, let me make to you the probably disillusioning announcement of my firm conviction that the one great peculiar characteristic virtue pertaining to the art of painting is the deft and exquisite laying on of paint! Small, simple, half-contemptible as this may seem, it is the only key to the study of the art of painting; and I want to direct your keenest attention towards it in order that you may be able to search for this quality in pictures, and know it when you find it. I cannot recommend you to begin your search for it in the exhibitions of to-day, but go to the National Gallery and look carefully at the drapery in Veronese's St. Helena, and try to realise the felicity of Ruskin's description of the painting of Veronese. I cannot find the quotation, but he describes it as consisting of touch after touch

laid on with a balanced, trained, and instantaneous skill similar to that of his finest fencing.

Look for yourselves and see the light come rippling down the edges of the folds, not in clumsy zig-zags, but in touches sensitively modelled from end to end, so that no two points of them are alike—and yet put there by a hand working at lightning speed, but with the same control with which the most perfect violinist pours out the cascade of his melody. Just look at the shape of each of the little touches of high light with which some sheen upon the silk dies away. Each is like the petal of a flower. Look at the shadows, liquid and deep: *like shadow*—you can look down into them as you look down into those of running water—the same transparency—yet mystery. See how the colours have been floated over one another in thin films with the most absolute knowledge of what effect the colour below will have, seen through those veils, how each will operate upon this; and you will soon begin to recognise that this is an *infinite* science: that such a painter, like a great composer in music, out of the infinite numbers possible to him, fuses together by the flashing instinct of his genius in one vivid moment those which will make the harmony at which he aims. Do you think me too enthusiastic? That such a trivial thing as laying on moist pigment with a hog-hair brush does not call for all this warmth? Well, let me justify it by a contrast. Walk away from the Veronese and look at the painting in one of Landseer's pictures—and I purposely choose as example the cleverest work I can find, to point out to you the difference between cleverness and genius.

With your eye full of the sweet tremulous iridescence of the St. Helena, where you cannot put a pin's point upon two bits of colour exactly alike (any more than you could upon the same thing in nature), look at the Landseer; a mass of opaque splashes, where you can tell to a hair's breadth where a square inch of yellow ochre leaves off and one of Roman ochre begins. Look at the high lights, like chalk marks, and the "high darks," like ink marks, and if you think that at any rate the hide of the dog is a triumph of skill, just go and look how Holbein paints fur in his picture of the Ambassadors, or in the portrait of Christina of Sweden, Duchess of Milan. Then take another look at the Veronese, and then go back to the Landseer—you will feel as if, after watching some graceful and skilful dancer, the rustling of silks and the sound of music, had suddenly presented to you the vision of some country clown plodding in miry ways.

Those of you who may happen to have seen in any exhibition any of my own poor efforts in art will be surprised to hear me insist so strongly on this purely technical skill. I do not undervalue high ideal, exalted thought, fine allegory, poetic intention, religious fervour—rather, perhaps, by nature I am tempted to lean on them too much; but it is my duty to tell you the truth, which came neither quickly nor easily to myself, but which is all the more sure for its having been slow, that all these things, all these fair thoughts and aspirations and ideals, good as they are in themselves, are only of the nature of good intentions (and we know where *they* go) until they have shaped themselves into deeds worthy of them by fine craftsmanship. A work of art which appeals to the manifold technical shortcomings to the lamely-expressed goodness of its purpose damages more than ought else can do the cause it pretends to advocate. Really earnest workers in the same arts who are in search of example and strengthening will submit it to stern testing and questioning, will find it a broken reed and throw it aside, and without pretending to any inspiration from like motives, will outdo it themselves, and pass it by until the world itself will at last discredit it, and the final impatient comment on it will be "Yes, yes, yes, we know what you want to say, but show us what you can do!"

The warning of these dangers, then, is needed—and especially by you; for the kind of painting which architecture draws into fellowship and co-operation with itself is (much to the honour of architecture) almost always of that kind which starts with high motives and deals with high themes. It is for this reason that I have been at such pains to point out to you the special technical and craftsmanly virtues of fine painting. I have brought these things, therefore, into sharp relief and contrasted them with those more mental and contemplative qualities which form so constantly the motive, and the expression of which is so often an ingredient in a work of painting.

But though I have brought them into contrast to show that they are two entirely different things and to show you their respective values and places,

do not run away with the idea that they are therefore incongruous qualities which in any sense exclude each other or between which there is in the nature of things any inevitable jealousy or contradiction. Thank heaven that is not so. It is theoretically possible, no doubt, that these things should exist in entire separation, and that the art of a Veronese (retaining all its splendour should spend itself on mean and trivial things. But if you spend a half-hour in the Dutch room of the National Gallery, and then walk into the Venetian room, you will not only feel that you are in the presence of a totally different and immeasurably higher skill of the human hand, but that the same transition has lifted you also into an incomparably more lofty mental atmosphere, and that you are in the presence of a much finer manifestation of the human soul.

Now it would be impossible for me, even if I were a fine painter, to give you a demonstration of the qualities I have been speaking of in a short lecture, and by artificial light. But there are certain things which I can show you by way of illustrating the resources of painting.

Here are a series of tints—I am afraid you cannot see them to much purpose by this light, but at any rate you can see that there is a good deal of variety between them—that this one, for instance, might be called purple, and this orange, yet they are only the results of two different ways of using exactly the same pigments. You would think, if you know little of colours, that a colour diluted would always be a fainter version of itself, that a colour strengthened would always be a stronger version of itself, and that, indeed, is the rule in colours modified by mixture. But in fine painting colours are modified quite a little much by superposition as by mixing; and that is the process I have here employed in its two great forms, glazing and scumbling. Glazing you will easily understand as the superposition of transparent colours—it is at the root of all Venetian excellence and brilliancy. Scumbling is an unfortunate word which always sounds like a bit of artistic slang, and has therefore time out of mind been used in trivial literature as the cognomen for a typical painter—"Mr. Scumble, R.A."—yet it is a fine process, though the word is awkward, and who knows how to use it is so far forth a painter in contradistinction to the man whose whole method of procedure consists, as in innumerable instances too modern to be quoted it *does* consist, in the mere mixing of colour together.

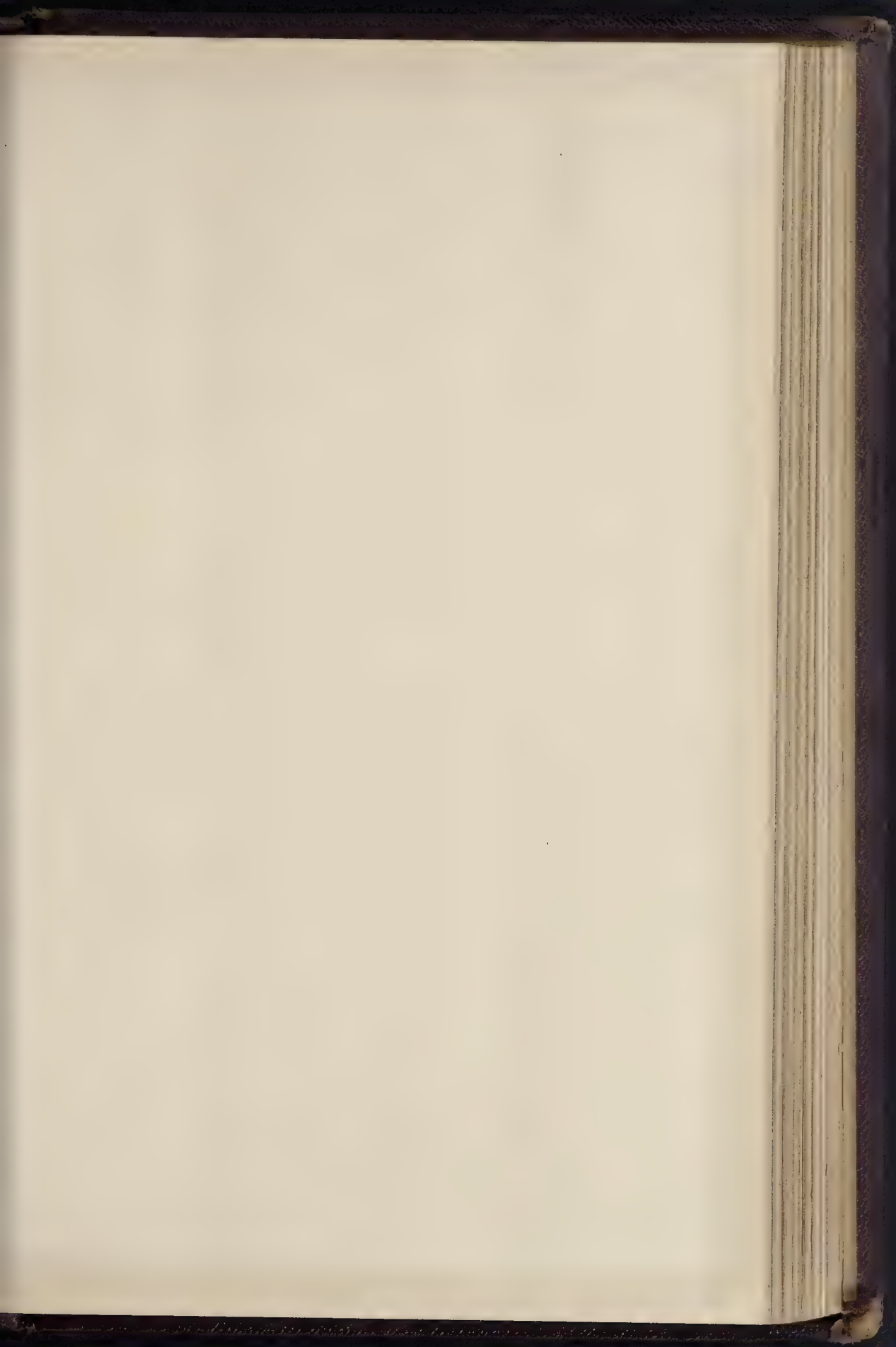
These, then, are all examples of the effects that can be obtained by the varied handling of one colour (a very modest one, Burnt umber) and white. This, which I have ventured to call purple, is white thinly scumbled over a dark space of Burnt umber. This which I have called orange is the exact reverse, Burnt umber thinly glazed over pure white. Those between are varieties of the same process in the degree of the thickness and darkness of the two colours used, and you must at once recognise the fact that, seeing that any one degree of the white can be modified with the whole gamut of the umber, and any one degree of the umber by the whole gamut of the white, you are in the presence of a problem which is practically infinite—and when we consider this extended to the use of a full palette of pigments we can understand that the choice of harmonic is as inexhaustible as in the case of music, and that a true colourist in the mere manipulation of his materials exercises the same kind of regard command over infinity as the composer of a fine sonata.

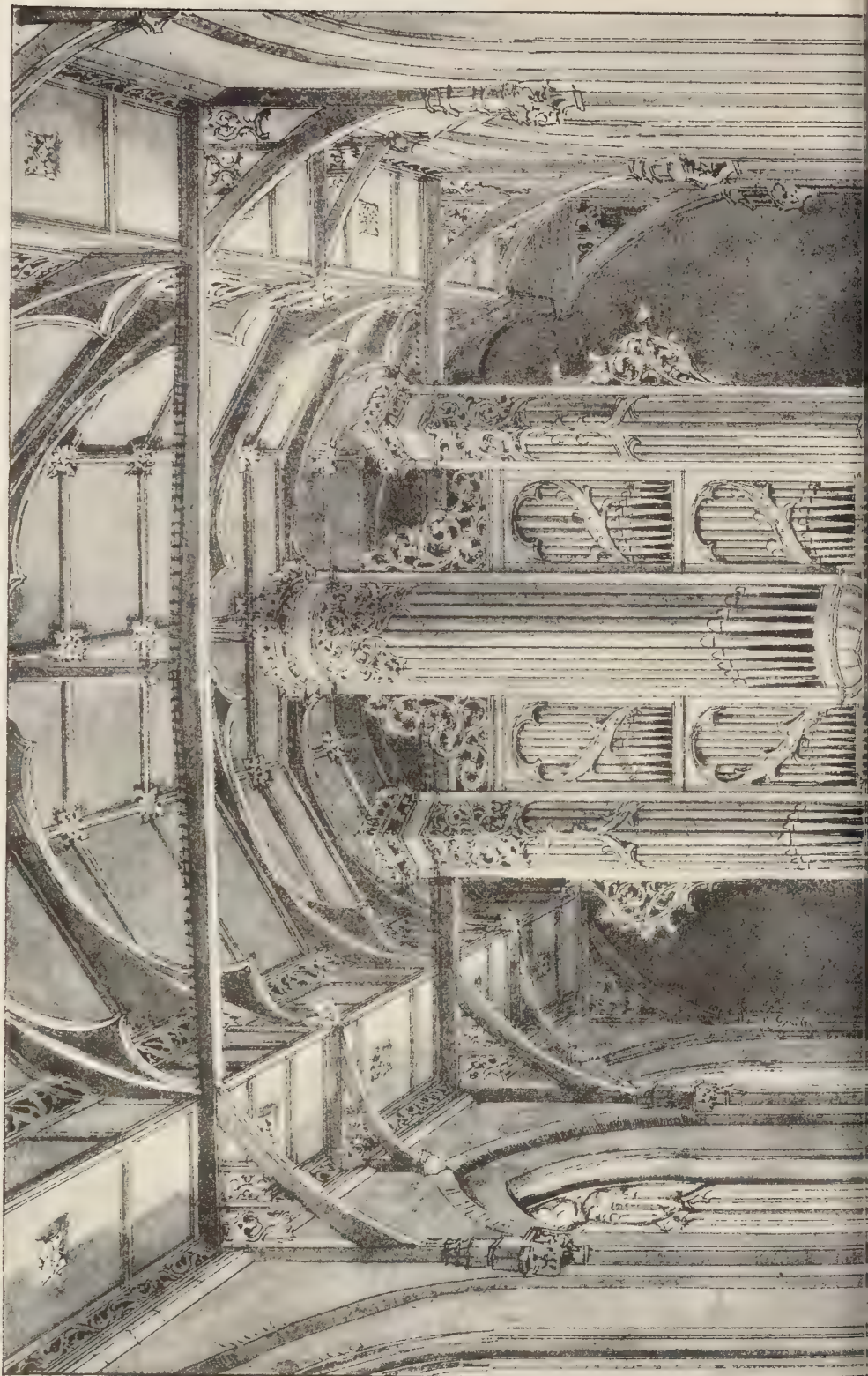
Having shown you how much can be done with simple means, I wish to insist upon the vital importance of working with simple means until their limits are reached. It is a very good thing to have perfect tools to work with, but you don't need me to tell you that a man who can't do any thing without extensive paraphernalia can't do anything at all. This dependence upon lavish means is, however, such a pestilential disease in all the arts of the present day that I shall spend a few minutes in emphasising the value of their simplicity. And I cannot do so better than by trying to illustrate my point by reference to your own art. I am sure you will approve me when I make the reflection that a man who cannot build anything presentable in brick will not mend his case by falling back upon marble. On the contrary, while in the former his dullness, being unassuming, may escape censure, the presumption implied in his dealing with a noble thing will most justly call it down upon him. It is a characteristic of all great art that it exhausts the means used, and the more elaborate these are the greater the difficulty of the problem. Now nothing depends so little upon elaborate means

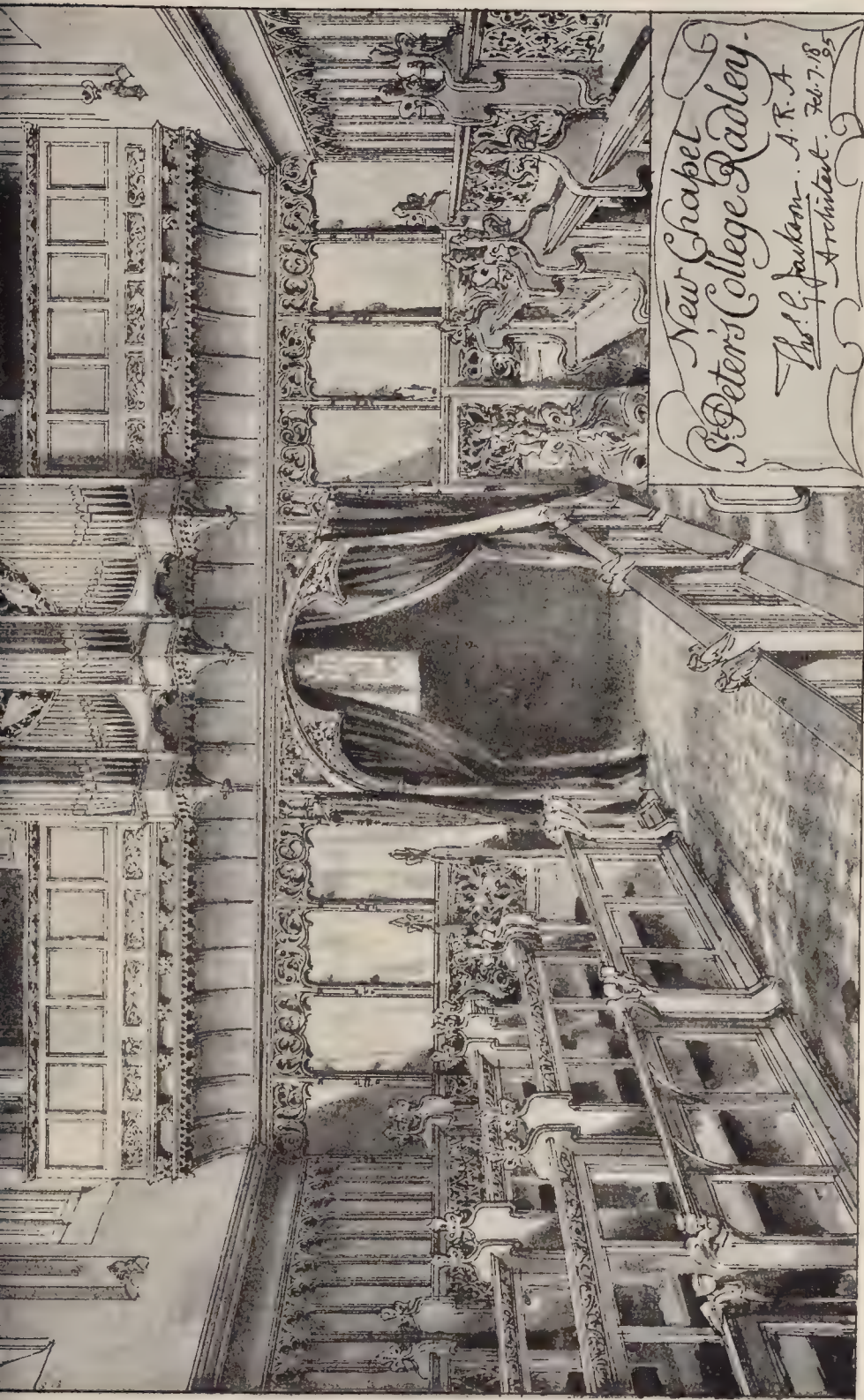
* Being a paper read by Mr. C. W. Whall at the last meeting of the Architectural Association, as elsewhere reported.



DESIGN FOR THE APSE WINDOWS OF GRACECHURCH, UTICA.—By Mr. HENRY HOLIDAY







New Chapel
St. Peter's College Radley.
Thos. G. Jackson. A.R.A.
Architect. Feb. 7. 1895

THE PHOTOGRAPH BY MR. HENRY HARRING STREET, WESTMINSTER, E.C.

fine painting. Give a painter who knows craft half-a-dozen brushes and half-a-dozen colours and the whole world is his own; while fresh pigment added to the palette is fresh danger and chance of failure. I remember some years ago in one of our exhibitions a case showing the development of a painted illustration in either the *Illustrated News* or *Graphic* in all its stages, there being, if I collect right, fifteen or sixteen coloured stones employed. The drawing was a dashing, clever thing enough. It was called "United Service," and represented two handsome young fellows, in dress, respectively, of the Army and Navy, sitting down the stair from the ball-room of a lady in white. The first few printings clearly showed the tints of the flesh, and the delicate pencil-like marks of the shading had given an air of great refinement. One thought of Caton Woodville or the Overland half-way yards being a Whistler, a "a song in stone."

The warm tones were printed first, and there were some delicate saffrons (azaleas and so forth the stair), working up through the white to the colour. So far all went well, and though the colour of the printings after the first four or five anything but harm, still the thing remained a kind of key, and even the red of the soldier's tunic, vulgar as it made the print look, did not render it positively unbearable; that was reserved for the blue-black of the naval uniform, which he crashing down upon the thing like a brass did out of tune, and sent one away saddened at the next inanity in the catalogue.

Now this contained a great lesson, and a most important one for you, gentlemen; for that simple little which I have been advocating brings as natural result work painted in a key. Look much of Burne-Jones's work—those cartoons which he paints in brown and steel-blue—at his frescoes, too, in the same tones of the "Annunciation," "The Fortune," "The Merlin," and the rest of the story of Perseus, and tell me if they are not noble colour. And in a more delicate and dainty key look at Whistler, with his tints of blue and silver, grey and gold, or at not, and (if he has not shaken the dust of ungrateful country from his feet for good) next time he holds an exhibition and (and this is coming near home to you indeed) see how he decks his room—working up from the white his woodwork through the pale fawn or lilac the matings and distempers, the cool, neutral tints of the picture-frames, which are neither nor gold, to perhaps some warm russet in upholstery, and a sudden blaze of gold and brown on a glowing screen.

There is nothing I should think more necessary you architects to bear in mind in using paint in conjunction with your buildings than this notion of working in a given key, and I purposely direct your attention at the outset to that titular picture of Veronese, because it is so useful an example of it. And that, curiously, is an unfinished picture. That lovely robe of Venetian red was doubtless meant to be glazed with luscious crimson, and I must not stain from the temerity of recording my opinion it is better without it, that even the great Venetians were mortal and sometimes revelled in wealth of their means and splendour of their dwellings with a luxury too unrestrained. Certain that Tintoret for this reason comes to me with a deeper appeal than even Veronese, and that of the latter his unfinished pictures, this Helen and the Annunciation in the Accademia is it Florence or Venice?—the angel has red hair like that of the St. Helen) and the noble figures in the Ducal Palace, at Venice, where he painted a key of white and gold, are to me his best work. And whatever question there may be about that, I think there can be none of the fact that in nine cases out of ten they would serve purposes of architecture better than those which look like a parterre of flowers. So remember, gentlemen (no doubt you will find it quite a new thing) next time some patron introduces you to a favourite R.A. to decorate the mansion or the arch that you have built, tell him what keys of colour will harmonise with your intention, and that the pigments he may use; remind him that you are the master of the situation, and that he must as he is told. You will get some valuable or, at any rate, emphatic information on the relationship between painting and architecture, and a good hook to hang it on.

I have now said all I can to direct your attention to what I will call the proper speciality of painting as a craft—that which belongs to it and to nothing else. I believe that it is the most necessary thing for you to know in starting your day of painting, and all the more so on account

of that which I have alluded to as so encouraging a fact in the present day—that the arts are seeking to find themselves on the fine forms of craftsmanship proper to each, rather than on academic theories and vague forms of dreaming.

The tendency of the arts at present, then, is to specialise themselves; but is their tendency also, then, on that account, to isolate themselves? One would fear it might be, and, perhaps, a search through the world of modern art would afford us some ground for supposing that it is. But I am certain that that would be as nothing to the arguments, growing daily stronger and stronger, for the opposite conviction, which has been cheering the heart of every craftsman and art-worker in the kingdom during the last few years with ever-growing appeal; a conviction that, in the searching after the special and individual excellencies of each craft, is being, in reality, rapidly discovered the proper ground on which they can all unite. You, gentlemen, by your study of the noble art which you have chosen to be your life's work, are preparing to stand in the place where, by the nature of things, all these various arts, which are so rapidly coming together, must meet. It will be your safest guide, I believe, in that perilous and responsible position, to remember that they meet there in virtue of their common motive—beauty; and that their common passport to that enchanted ground is craftsmanship.

This age has been too much swamped and stifled by academic methods of study, and it is certain that for a long time yet much instruction must be given in this way (what, indeed, am I doing at this moment?).

Yet, side by side with your lectures and treatises, take every chance that offers of learning at the bench or on the scaffold, at the anvil or at the easel. Where you see work going on ask technical questions, which will do good to him you ask as well as to you, and take every opportunity of getting at the actual tools and the actual stuff.

And now that I have tried to give you a general clue to the subject by establishing some first principle, let us turn our eyes upon the field of modern effort in painting, and try to find our way. And none too soon, for, gentlemen, you probably know—if not, I am happy to tell you—that cabinet pictures are a drug in the market, and you will very soon have all the jarring schools clamouring round you for employment! Indeed, if I live for another twenty years, I shall not be surprised to see—I shall expect to see—and, need I add, I shall most thankfully rejoice to see—architecture the acknowledged leader, ruler, and guide of all the arts in this country.

THE ARCHITECTURAL ASSOCIATION SPRING VISITS:

ST. OLAVE'S GRAMMAR SCHOOL, SOUTHWARK.

The seventh and concluding spring visit was paid on Saturday last to the St. Olave's Grammar School, Southwark, when a large number of members assembled. The party were met by the architect of the building, Mr. E. W. Mountford, President of the Architectural Association, and were shown over the building by him. The buildings, to some extent, replace three schools which have successively occupied portions of the site. The later school-buildings were only intended to be altered by the Governors, but the Charity Commissioners insisting on an entirely new scheme the present building for 300 students was erected.

The general scheme consists of a large central hall, the whole height of the building, with class-rooms ranged around two stories in height. The caretaker is placed on the third floor. The head-master and assistant-masters do not live in the school-buildings. The building has no passages, the class-rooms opening direct off the school-room on the ground floor, and onto a gallery supported on cantilevers projecting into the hall on the first floor level.

The central hall, or school-hall, is 80 ft. by 40 ft. and 44 ft. high to the top of the wooden barrel-vault. The lower part is panelled in deal, stained and varnished with dull varnish, and so treated as to make it similar in appearance to old deal untouched. Above this, and representing the first floor, projects the balcony, which acts as a means of communication to the first-floor class-rooms. This is carried on wooden cantilevers and furnished with turned wooden balusters. The main roof to the hall is very successfully treated. It is essentially of king-post type, but with the tie-

beam resting on hammer-beams. Above the roof is framed out to a semi-circular barrel-form, in the circular soffit of which are introduced dormer windows, which serve for light and ventilation.

The interior of the roof is lined with stained deal, dull varnished. The tie-beams are carried across and emphasised with mouldings and carving, being supported by the turned king-post. The dual desks and other school fittings have been supplied by the North of England School Furniture Co., Limited.

The Governors' Room was much admired. It is lined with the oak panelling from the old buildings made up with new. The ceiling is richly treated with plaster ribs, carving, and supporting figures above the cornice of the room. This work has been executed by Mr. Gilbert Seale, of Camberwell. The stone mantel piece is in Monk's Park stone, and is a successful, yet simple, piece of Mr. Mountford's work. The sculpture work to this has been executed by Mr. Paul Montford, Royal Academy Gold Medalist in Sculpture. The electroliters to this room have been designed by the architect, and executed by Messrs. Singer, of Stroud; who also executed the more elaborate, but scarcely so successful electroliters which hang from the roof of the main hall.

The head-master's room on the first-floor is lined with Oregon pine, stained cherry-colour and dull varnished.

The chemical laboratories on the third-floor in the roof, have been fitted up in detail from the architect's designs; the fittings are in Bass wood with glass tops to the shelves, the tops of the benches being of teak. The walls in these rooms are of Portland cement, from 5 ft. in height, the remainder being in ordinary plaster. The construction of the floors is fireproof throughout, being composed of steel joists and coke-breeze concrete in the proportion of one of Portland cement to five of coke-breeze, and are 7 in. thick. The steps to the first-floor are in York stone. The heating is effected by means of Berry radiators, supplied with water on the low-pressure system, cold air being introduced over these direct from the outer air beneath the windows.

The exterior is executed in Laurence's bricks and Portland-stone, and the roofs are covered with green Westmoreland slates. Although not the largest of the architect's works, it is certainly one of the most successful. The simplicity of general treatment, the careful balance of part to part, and the general sense of proportion throughout the whole work, were the points which the members were mostly impressed with.

The cost of the building will be about 28,000l. Mr. Peacock has acted as clerk of the works. The members were afterwards entertained at tea, after which Mr. Banister F. Fletcher, Hon. Sec., proposed a vote of thanks to Mr. Mountford for his kindness, remarking how fortunate it was that their last spring visit should be to a building so worthy of their study. Mr. Mountford replied, and remarked on the pleasure he had had in conducting the members over his building.

ARCHÆOLOGICAL SOCIETIES.

NEWCASTLE SOCIETY OF ANTIQUARIES.—The monthly meeting of the Society of Antiquaries of Newcastle-on-Tyne was held on the 24th ult. in the Castle, under the presidency of Mr. H. A. Adamson. The Council recommended that there should be three day meetings of the Society during the year, the centres on each day to be Bishop Auckland, Haltwhistle, and Wooler. Half-day meetings on Saturday afternoons were recommended to take place at Finchale, the Newcastle Churches, the walls of Newcastle, and Houghton-le-Spring. Mr. Clephan had also invited the members to Low Fell to see his Egyptian collection. The Council recommended that next year there should be another pilgrimage to the Roman Wall in conjunction with the Cumberland Society. The recommendations of the Council were adopted, with the addition of another day's meeting to Holy Island during the year. Mr. Holmes, the treasurer, presented to the Society a plan of Æsica, showing the excavations which had taken place during the past year, and the chairman presented a Corinthian capital and the chairman presented a Corinthian capital from Ascalon in Syria.


Both presents were accepted with thanks. The Rev. H. C. Savage, Vicar of St. Hilda's, South Shields, read a paper on "Easington Church." Mr. George Reavell, Junr., read some notes of discoveries at Hulne Abbey, Alnwick. The chief point mentioned was that during some alterations in the keeper's house, and on taking down the old chimney-breasts, an arch was discovered with two peculiar hagiostopes at the side of the archway.

* The conclusion will be given in our next.

† See the *Builder*, June 9, 1893.

Illustrations.

APSE WINDOWS, GRACE CHURCH, UTICA.

 THE illustration shows the windows designed by Mr. Henry Holiday for a church in the United States. In regard to the general idea and scheme of the design, Mr. Holiday writes:—

"The subject suggested to me for the chancel windows of Grace Church, Utica, was 'Praise,' to be expressed by a series of celestial figures in the upper part of the windows and terrestrial in the lower part: these latter to be persons noted for their hymns of praise—David, Deborah, the Virgin Mary, &c. As there are seven windows, it occurred to me that it would enrich the subject to include the idea of Creation, and with this view I have occupied the seven quatrefoils with the Six Days of Creation, and the Day of Rest, while six of the square panels illustrate the hymn, 'Oh! all ye works of the Lord, bless ye the Lord'; the seventh representing the Saints' Rest in Paradise. Each of these panels has special reference to the day of Creation illustrating the same light.

This design was made some years ago, though only recently executed, and in the meantime, when asked to design a Creation window for the west end of St. Saviour's, Southwark, I showed this design to the committee, who approved of its being adapted to their three-light window, in which the composition is necessarily quite different, though many of the features are identical.

With this clue to the scheme, I fancy your reproduction will explain itself."

RADLEY COLLEGE CHAPEL.

The new chapel now being built at Radley College by Mr. T. G. Jackson, A.R.A., stands slightly to the south of the old chapel, and communicates with the rest of the College by a new cloister and dormitory above. The old chapel was a building of temporary construction, but contained some handsome oak stalls and panelling, and a very fine old German reredos which are being removed and fitted with some adaptation to the new building.

The new chapel is 32 ft. wide by 130 ft. long (including an antechapel under the organ-loft) and 40 ft. high to the plate. The walls are of red brick inside and out, with dressings of hard Doulton and Weldon stone, and the roof and ceiling will be of oak.

The builder is Mr. Estcourt, of Gloucester, and Mr. Long is clerk of works. The heating is by Messrs. Haden, of Trowbridge.

It is proposed to proceed at once with the new dining-hall and other buildings on the completion of the chapel, which is to be opened on St. Peter's Day, June 29.

BOLTON ABBEY.*

The view of Bolton Abbey is taken from the north-west of the church, showing in the foreground the west tower, which was commenced by the last Prior, Moone, in the early part of the fifteenth century, but was never completed. Beyond is seen the end of the north aisle, the only aisle, and the remains of the north transept.

Bolton Priory (as it is more properly called), was a priory of the Austin Canons, at first founded at Embsay, 1120, and afterwards transferred to Bolton, where the buildings were commenced in 1151 in the style of Transitional Norman, of which erection a considerable portion of the choir, and parts of the south transept, and nave still remain, the chief portion of the nave having been rebuilt in the Early English style, and the east end of the choir, subsequently, in the "Decorated" period.

The following remarks on the special points in regard to the plan and architectural treatment are taken from the excellent paper read on the subject by Mr. J. T. Micklethwaite, on the occasion of a visit to Bolton by the Yorkshire Archaeological and Topographical Society; a paper which still remains the best analysis of the building.

"The church of a house of canons has peculiarities which differ altogether from those which we find in the churches of any of the monastic orders. One of the commonest, and at first sight most unaccountable, of these is that the nave has only one aisle, as we find it here and at Easby,

at Kirkham, at Brinkbourn, at Lanercost, at Hexham, at Dorchester, at Boxgrove, and at many other places. Most of these churches are buildings of considerable architectural pretension, in which the absence of south aisle—for it is generally the south that is wanting—appears as a great defect, and people generally put it down as an exhibition of that caprice which is supposed to have animated the Mediæval builders. Now, as I am one of those who hold that Mediæval English builders were not, as a rule, capricious, I wish to show that this one-aisled plan came perfectly naturally, and was the legitimate consequence of the conditions under which the work was executed.

The monastic and collegiate church plans, though in late times they often became very much alike, have quite distinct origins. The ordinary monastic church from the earliest time was a large cruciform building, with aisles, and this so far satisfied later ideas of magnificence that we often find that throughout all subsequent rebuildings the Norman plan was retained unaltered, except by the addition of a few chapels about the east end. Westminster, Gloucester, and Winchester are examples; whilst even in churches such as Canterbury, which have been considerably enlarged, the change has taken the form of extension rather than alteration of the original plan. The secular cathedrals seem early to have imitated the abbey. But many other foundations of canons, whether regular or secular, are built on a quite different model—namely, the parish church. In fact, most canons' churches actually were parish churches, either before they were made collegiate or from their foundation, if they were absolutely new.

Now the original parish church plan differed from the monastic in that it was entirely without aisles. Our parish churches at first built were sometimes cruciform, and sometimes without transepts, but in either case aisleless; and if there was a tower it was in the centre of the building over the chancel, the sanctuary forming the eastern arm, and the transepts, if there were any, the north and south. The canons took the cruciform, which was the finer type of parish church before them, and glorified it by making it larger, so much so sometimes as to make it vie with the cathedrals in scale, but still keeping its characteristic want of aisles. Here at Bolton, for example, if you look for the remains of the original twelfth-century work you will find none in any part which cannot have belonged to an aisleless church, with chapels east of the transepts. If you look at the building you will find that as usual the work has begun with the choir, and worked gradually westward. The earliest part is the lower part of the side walls of the choir, which, though it was afterwards lengthened, and almost wholly rebuilt, kept its aisleless form to the east. The early work here must date from about the time of the foundation. The great piers of the crossing show remains a little more advanced in style, and in the lower part of the south wall of the nave, which is all that remains there of the original work, we find the pointed arch and other characteristics of the Transitional period.

The church had not been long finished before the alterations began, as they did in nearly every other church of the same sort. The canons felt that their churches were inferior to those of the monks, and notwithstanding their length they were cramped for want of breadth. They craved for the addition of aisles, which were now becoming common, even in parish churches. But here the regular canons, and a good many of the seculars also, were met with a difficulty. Along one wall of the nave ran the cloister, and important buildings abutted against it towards its west end. To add an aisle on that side would have been expensive and very inconvenient; so they were content with one on the other side only, where the ground was free. Where there was no cloister, as at Ripon, two aisles were added; and the alteration was so general that Bayham, in Sussex, and Lilleshall, in Shropshire, are the only churches of any size which I remember to have kept their aisleless naves up to the time of the general suppression.

The aisle at Bolton was added, as the west front shows, early in the thirteenth-century—very few years after the church was finished. It has been somewhat altered in parts since, but on plan it remains the same. To compensate for the want of aisle on the south side, the wall was taken down as far as the roof of the cloister, and the existing range of five fine windows set up in its place. These windows were only carried for the length of the cloister, because further west a lofty range of building abutted upon the church. That part of the wall was therefore not taken down,

and on the inside you may trace the difference between its masonry and that of the newer work.

In the fourteenth-century the choir and transepts were magnificently rebuilt almost from the foundations, and at the same time somewhat extended. The choir, even in its present condition, is one of the most beautiful architectural compositions in England.

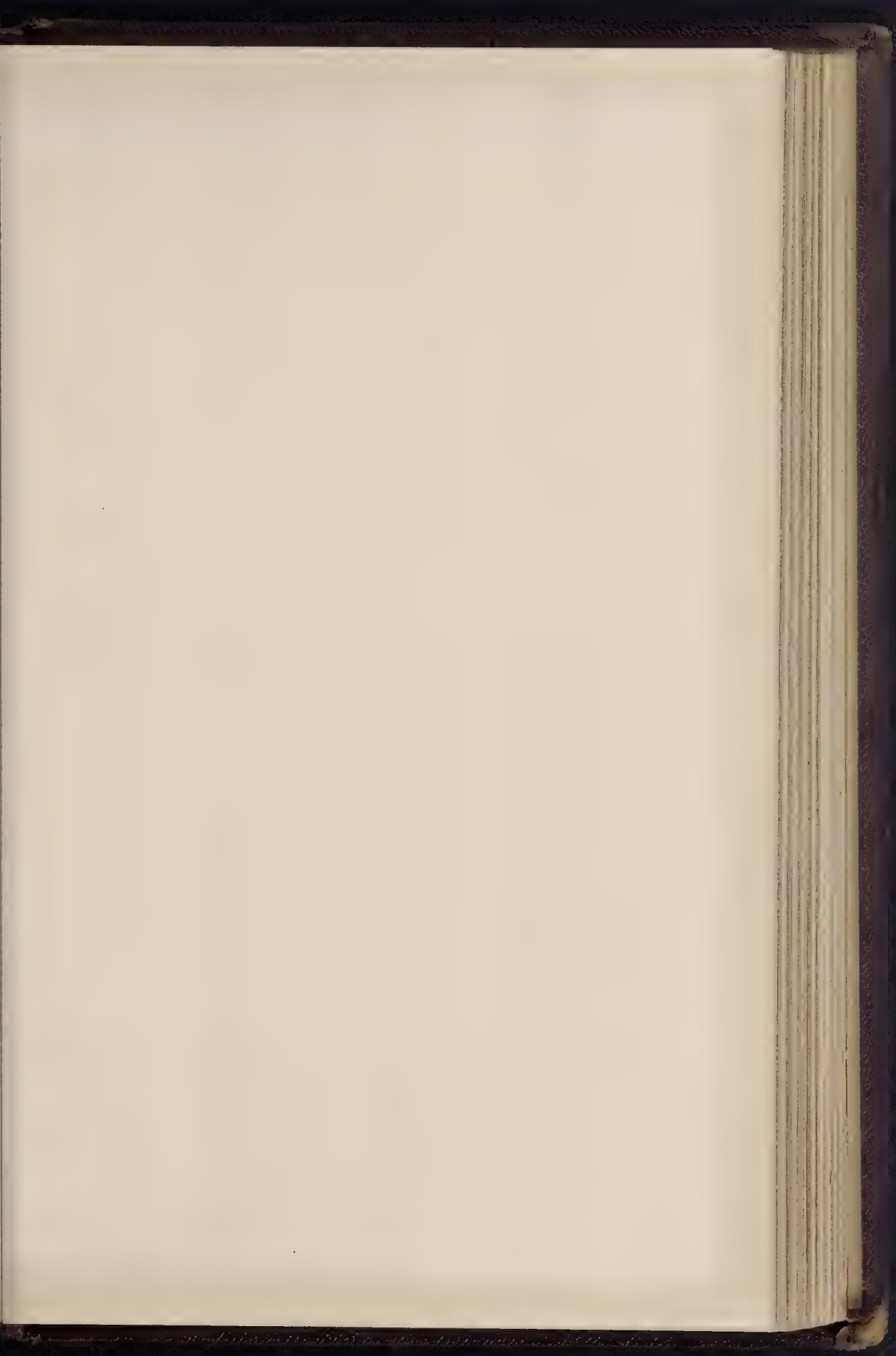
The latest work at this church is especially interesting, because it shows us arrested in a way a process which has been applied to nearly all the parish churches in England, and which has entirely altered their external character. I said just now that when a church had a tower at its first building it was always in the centre. Whence comes it, then, that nine out of ten, as we now see them, are at the west end? The reason is that such towers are always additions. The greater number of parish churches were without towers at first. We may take the little church of Adel as an unaltered and typical example of what most others have grown from. But in later times, and chiefly in the fourteenth and fifteenth centuries, towers became fashionable, and it was a very poor parish which was without one in the sixteenth. These towers were built very slowly—sometimes, I believe, they were going on for the greater part of a century—and it was important to avoid disturbing the church and interfering with its continued use, as would have been done by breaking into it, especially in the middle. The new towers were therefore built on fresh ground outside the church, generally at the west end; and then, when the work was done, the west end of the nave was taken down and the building joined on to the tower. The same was also often done in churches which, like this one, had at first central towers, for, if for any reason the tower had to be rebuilt it was easier to do it outside than inside the church. And this was the common case, for twelfth-century towers were much given to tumbling down, and the earlier ones had very heavy piers, which took up a great deal of room, and were likely to be condemned as obstructions during the progress of later improvements. Thus it has come about that in spite of the central position being the normal one in a parish church, it has been almost wholly superseded by the western tower.

What became of the original central tower at Bolton is, I think, not known. Perhaps its fall may have caused the general rebuilding of choir and transepts in the fourteenth century; perhaps it may have been taken down at that time and not rebuilt; or perhaps it may have stood till the end, and only fallen when the whole eastern part of the church was allowed to go to ruin. I do not think the last is very likely; but, however, it may have been, it was thought fit in the sixteenth century to build another tower at the west end, and as the inscription tells us, it was begun in 1520. At the suppression twenty years later, the work had only reached the height of the nave, and in that state it has come down to us. The thirteenth century west front is still standing, and close to it is the large arch of the tower, which, if the work had been allowed to go on a few years longer, would have opened into the nave.

The process, which is here so clearly displayed to us, may be traced in nearly every church with a western tower, except that in a few the nave itself has been rebuilt, either together with or after the tower.

Of the ancient furniture unfortunately, scarcely anything remains now. The canons, although, as we have seen, they took the general form of their church from that of a parish church, arranged it entirely in their own way. A parish church is all one, the nave and chancel being only different divisions of the same apartment. But the canons made it two. They wanted the choir for their own services, and so they fenced it off in a way which takes from it all ritual resemblance to the parish church. The choir was cut off from the nave by two solid screens; one in the eastern and one in the western arch of the central tower. The eastern screen, called in Latin *pulpitum*, and at Ripon, if not elsewhere, in English *purpytil*, had a broad gallery above it from which parts of the service were sung, and where the organ generally stood, as it continued to do in most of our cathedrals till quite lately. The western screen was the rood-screen—not a light wooden screen such as we are accustomed to associate with that name in parish churches, but a solid wall with an altar in the middle, and a pair of little doors, one at each end. This arrangement was also found in the monastic churches. The only instances I remember where the rood-screen of this form still exists are at St. Albans and at Boxgrove. I think it is also at Wymondham, but I am not sure.

* The series of the "Abbeys of Great Britain" is continued this month with illustrations of "Bolton." Particulars of this and of the three Cathedral series ("England and Wales," "Scotland," and "Ireland") will be found on p. xx; also (on page 1) of the recent re-issue, in book form, of the series of English and Welsh Cathedrals.



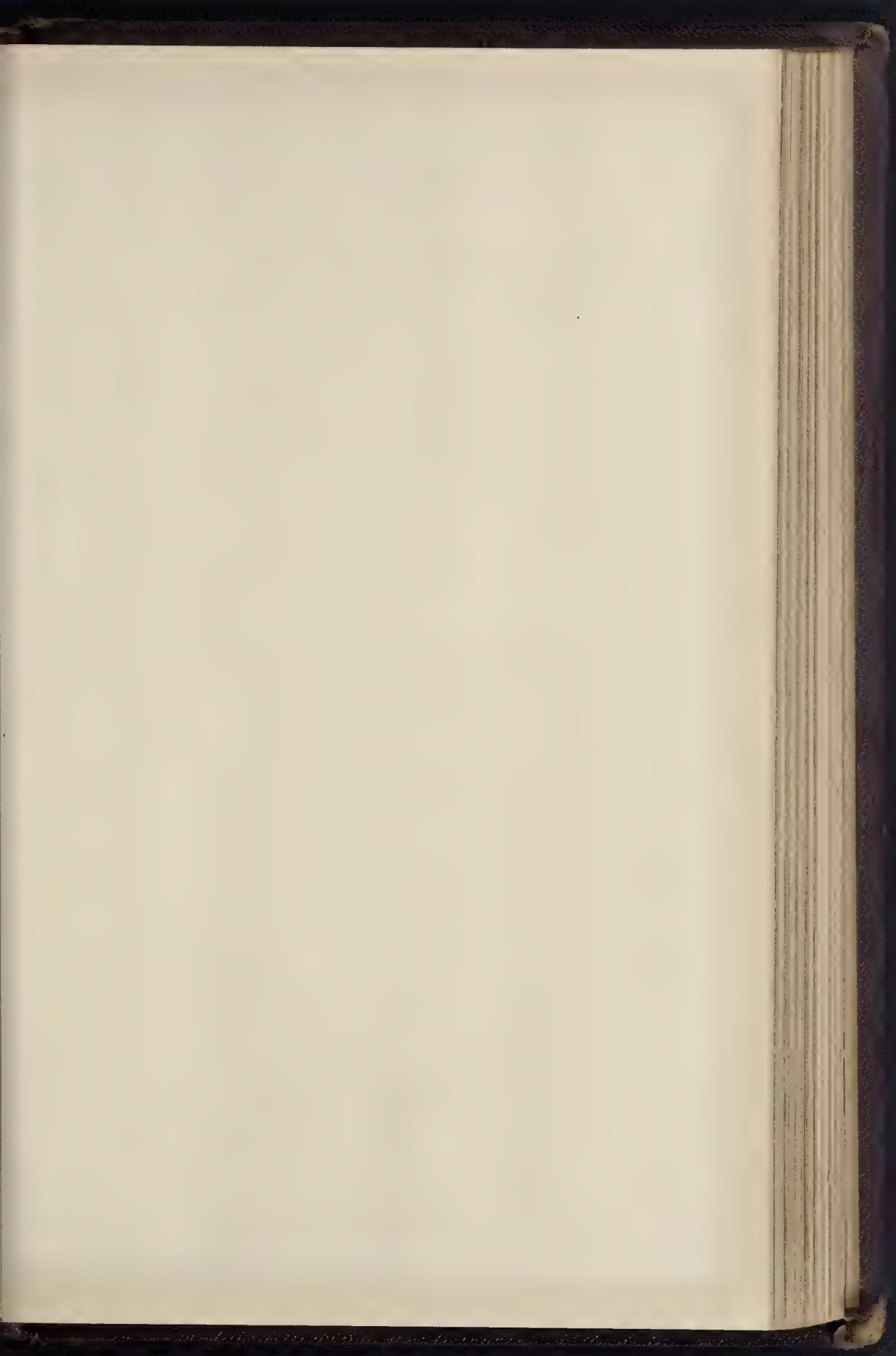


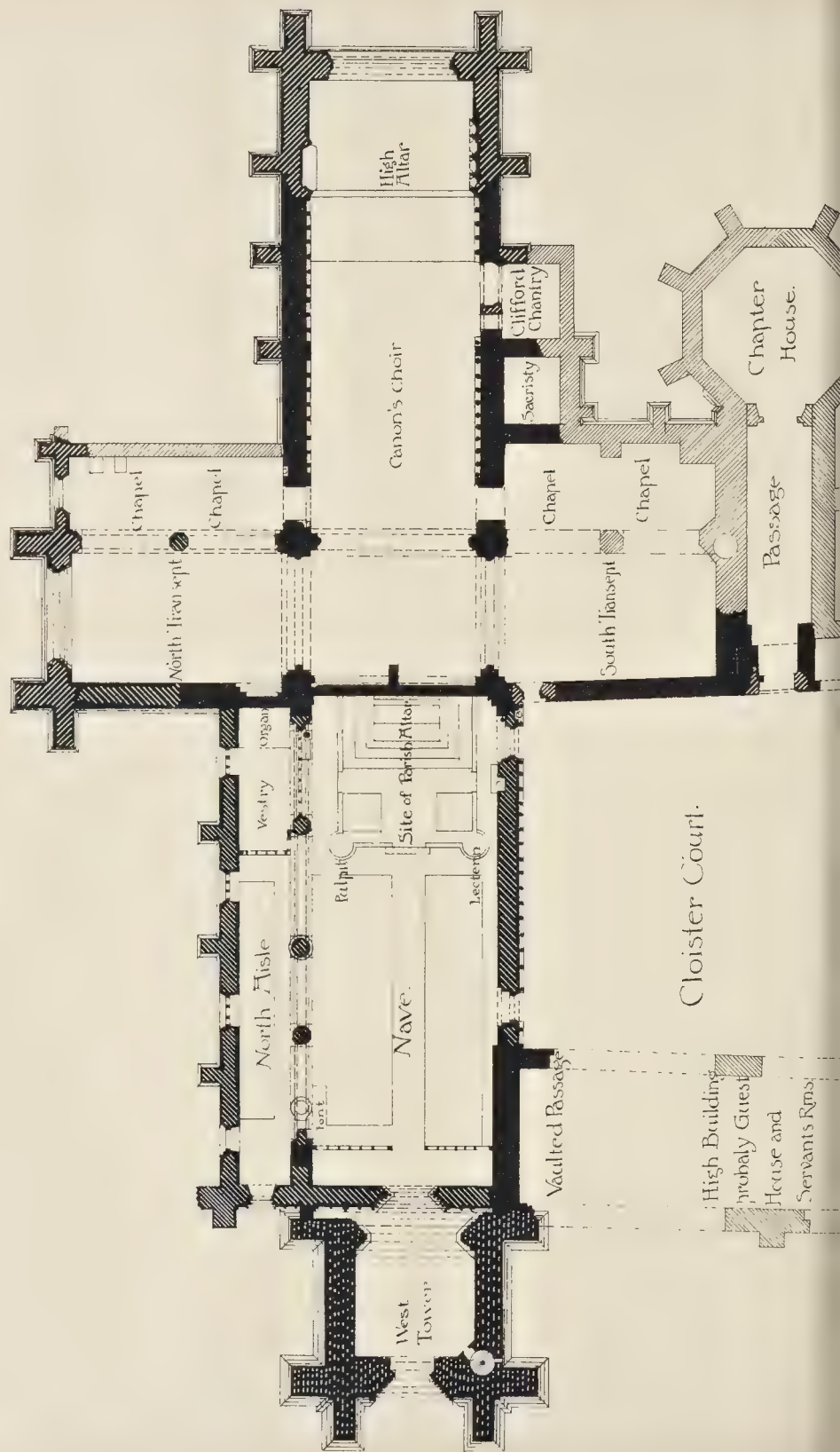
THE ABBEYS OF GREAT BRITAIN



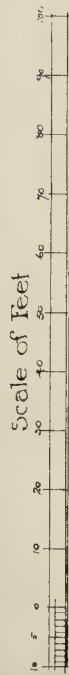
PHOTO LITHO SPRAGUE & CO 4 & 5 EAST HARDING STREET FETTER LANE E.C.

TON: FROM THE NORTH-WEST.





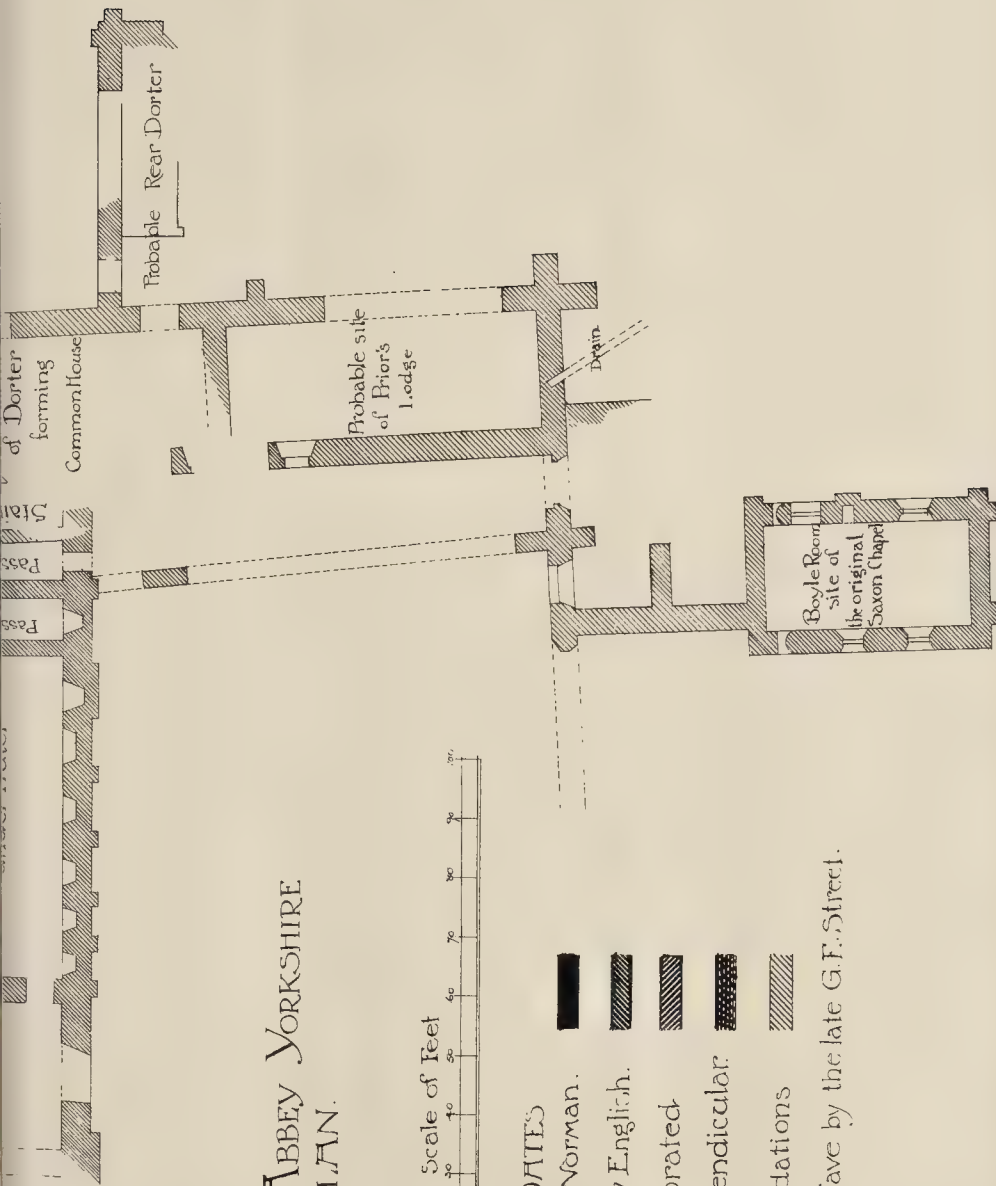
BOLTON ABBEY YORKSHIRE GROUND PLAN.



KEY TO DATES

- Trans. Norman.
- Early English.
- Decorated
- Perpendicular
- Foundations

Fittings of Nave by the late G.F. Street.



This altar, which, from its position, generally called the name of the *Jesus Altar*, or the *Altar of Cross*, was for the use of the public, and when the church was partly parochial, this was the parish altar. Here at Bolton it stood exactly where the parish altar still stands, and in the south wall of the nave you will find the piscina which belonged to it; and near is a plain stone bench which served for what we now call the *sedilia*. The presence of this altar, and the public use of it, has proved the naves of several fine churches when the choir has gone to ruin.

The screen at the west end of the nave contains one old fragment which, no doubt, at one time made part of the enclosure of some of the chapels. There is a story that the screen at Bolton comes from here, but it is very unlikely. There is no place here that it would suit, and it looks very much as if it had been named for the church it is now in. In the south transept are the remains of two altars, and there is the tomb of another lying in the tower. This last is a rectangular sinking in the middle which has been taken for the "sepulchre" or place for the reception of relics which were inclosed there under the small stone called the "seal" of the altar. But it is much too shallow for that use. It is probably no more than the matrix of a mass plate, which has been let into the stone at one time when it has been re-used to cover a grave.

The three panels over the Early English west door have been painted. The subject appears to have been our Lord seated, and with angels on either side. These are the only external medieval pictures I have seen in England, but there are traces of decorative painting outside the dy Chancel at Ely.

Of the domestic buildings of the Priory little remains except foundations. Those surrounding the cloister are easily identified, because there is the arrangement of them, which is at least as old as the thirteenth century, and was followed by nearly all the orders.

The cloister here was small. It had the usual arrangement into the nave, and close to the eastern end another into the south transept, which may serve to remind us how complete was the separation between the nave and the part of the church which the canons reserved for their own use. At the end of the south transept is a passage leading to the Chapter House, which was a small personal building. The Dorter or dormitory to the south from the transept above the passage to the Chapter House and some other apartments, the most important of which was the common house. This, as well as the Dorter, was, I think, reached from the cloister by the door in the south-east corner. The Frater or hall took up the whole south side of the cloister. It was raised on a basement, part of which formed passages, the rest was no doubt a cellar for stores. At the south-west corner of the cloister is a mass of masonry, which, I think, marks the foot of the stairs to the Frater. On the west side was a large building, the height of which may be seen by the marks which remain on the building, which was appropriated to the Frater, who had charge of the general stores of the lay servants of the house and the greater number of the guests, for which purposes required a great deal of space both for the house and lodging room. This is the building which Mr. Sharpe called the *domus conversorum* in his Cistercian plan, and, laying aside the controversy about the name, he was at least to a certain extent. But it was a good deal more than the house of the *conversi*, and where it was in a reasonable state of preservation it is easily easy to trace the divisions.

beyond the cloister there are considerable remains of buildings towards the south and east, without further information than we possess cannot identify them with certainty."

COMPETITIONS.

LOW AND STERNY FOUNDATION BOYS' SCHOOL.—The Governors of this Foundation are at to add to their present School Buildings a new Department, and have selected, from a recent competition, the designs of Messrs. Messrs. and Howard Chatfield Clarke. The additions will include a Chemical Laboratory, a Preparation Room, a Lecture Theatre, a Physical Laboratory, and Mechanical Instruction room. The additions will form a complete wing themselves to the present building, and the addition to such new wing has been made to harmonize with the existing premises, which are situated in Tredegar-square, Bow.

THE ROYAL SOCIETY CONVERSAZIONE.

THE exhibits at the Soirée of the Royal Society on Wednesday last, were of more than usual interest. There was a comparative absence of noises in the various appliances, which tended to the better appreciation of the objects got together, and added to the general comfort of the evening.

Of course, argon was represented, and Professor Ramsay made a very interesting exhibit by showing its spectrum, as well as that of a mixture of argon and helium extracted from the newly-famed mineral cleveite. It will be remembered that prior to its discovery in association with argon, the other day, helium was not known to exist on the earth, although incandescent material giving the same lines in the spectrum had been proved to exist in the sun. This is a great triumph for the spectroscopist; the element was named from its known occurrence in the sun, in the first place.

Electrical exhibits were fairly numerous, amongst the more interesting being specimens of the deposit or incrustation found on the insulators of the electric light mains at St. Pancras, together with insulators and wood bearers which were in use on these mains. Major Cardew stated that the deposit was found to have been caused by the passage of alkaline salts in solution to the negative main, the salts being chiefly derived from the neighbouring soil with which the end fibres of the wood bearers were in contact.

Electrolysis of these salts took place with liberation of the metals at the negative main, the metals being oxidised and slowly carbonated in air. During this process nodules of the metal seem to have become embedded in the oxides, and preserved from oxidation. Thus it appears to be a tolerably easy matter to prevent this incrustation in future, and the chances of explosions due to the ignition of metallic sodium in presence of coal gas will therefore be minimised.

Professor Roberts-Austen's electrical furnace is capable of reducing metals, which until now, have proved too refractory to be satisfactorily melted. It is capable of dealing with chromium, titanium, platinum, and other metals having high melting points. The furnace consists of a fireclay case lined with magnesia, and containing a magnesia crucible. The carbon poles are horizontal, the arc being deflected by means of a magnet on the material to be heated; the current employed is usually about 60 to 70 amperes at 100 volts.

The professor mentioned that the temperature attained in the operation was about 3,000° Cent. A magnet, exhibiting the effects of currents in iron on its magnetization, was shown by Dr. Hopkinson; while Professor W. M. Hicks had an instrument for analysing primary and secondary volts and amperes simultaneously. An interesting display closely allied with the last-mentioned exhibit, was a synchronizing alternating current motor and contact maker, for the delineation of the form of alternating current and electromotive force curves, and a form of resistance of small inductance for use with the apparatus, which was explained by Professor J. A. Fleming. This motor enables the curves delineating the form of the waves of alternating current or pressure to be taken at any part of the circuit, and when the alternators are not accessible. A large collection of such curves were shown as taken at the Bankside station of the City of London Electric Lighting Company. Mr. R. E. Crompton sent some simple forms of platinum thermometers for use with a new form of potentiometer for ratio measurements, also exhibited.

The experimental apparatus shows the small consumption of electrical energy required to maintain a small crucible at a constant high temperature, when radiation is prevented. A new instrument for testing the quality of iron in regard to magnetic hysteresis, of special use in testing sheet-iron for transformers and dynamo armatures was exhibited by Professor Ewing. It may be briefly described as follows:—A few strips of the iron to be tested are cut 3 in. in length. These are clamped in a carrier, which is then caused to revolve between the poles of a magnet. The latter is suspended on a knife edge, and becomes deflected in consequence of the work expended in overcoming the magnetic hysteresis of the sample; the amount of the deflection serves as a measure of the hysteresis. Mr. L. Pyke had an arrangement by which an increased efficiency in the reduction of the highly electro-positive metals from aqueous solutions is obtained; and Major Holden displayed some optical electric meters.

Perhaps the most noteworthy exhibit from our view was an instrument known as a circlograph, by the inventor, Mr. T. Clarkson. This is useful in drawing and measuring circular curves of

any large radius without requiring the centre. In other words, it is possible therewith to arrive at the length of the radius of any large circle when only an arc of the circle is given. The construction of the instrument is based upon a knowledge of the fact that it is possible to cut a flat plate of steel into a certain form, which imparts to it the property of bending always into circular curves. The steel must of necessity be of uniform thickness and temper, and herein consisted the difficulty of employing it prior to the adoption of the method explained by the inventor. To cut the strip of steel from a larger piece by mechanical means would have created strain in the metal, which would have been fatal to its employment in this connexion. The plan resorted to was to etch the strip from the parent sheet by acid. Judging from a somewhat careful examination of the instrument we are inclined to the belief that it is capable of giving approximately accurate results, and no doubt, if it were made more delicately, with proper vernier and lens, it would be better still for drawing purposes. It is highly improbable that the steel strip, although subjected to continual bending and unbending, would materially suffer from "fatigue," and providing great care is exercised in the manufacture of the steel, so that its thickness is microscopically exact, we see no reason why this cheap and useful instrument should not form part of the accessories of the drawing office. Its use in measuring curves is such as to save hours of labour.

The principal library was quite lighted up at intervals by the combustion of acetylene which bids fair to rival coal-gas and electricity as an illuminant. Professor V. B. Lewes in connexion with this exhibited a preparation of acetylene from calcic carbide, which carbide is formed by the action of carbon on lime at the temperature of the electric furnace. This is decomposed by water dropping upon it, with the evolution of acetylene. When consumed in suitable burners it develops an illuminating value of 240 candles per 5 cubic feet of the gas. The flame was intensely bright, but pleasant, and that it is comparatively cool may be judged from the circumstance that one could hold a hand over the flame at a distance of 5 in. to 6 in. without experiencing discomfort. Mr. R. Inwards showed some examples of curious joints in carpentry, made without compression or veneering, which might have been better understood if they had been accompanied by succinct verbal or written explanation. As it was, it was difficult to see in what way these joints differed from others we have examined from time to time.

The above comprise the exhibits of special interest to us, but many others dealing with the registration of temperature, natural history objects, &c., were included in the display.

INCORPORATED ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.

A LANCASHIRE and Cheshire District Meeting of the Association of Municipal and County Engineers was held in the Sir Ralph Pendlebury Memorial Hall, Stockport, on Saturday last. The members attending the meeting were received by the Mayor (Mr. F. R. Robinson), who presided during the first part of the proceedings. The members of the Association present included the President, Mr. A. M. Fowler, of Stockport; Messrs. T. de Courcy Meade, Manchester; J. Cartwright, Bury; J. T. Eayrs, West Bromwich; F. C. Wike, Sheffield; R. Godfrey, King's Norton; T. Brierley, Newton-in-Makerfield; W. W. S. Exote, Halifax; T. Mawbey, Leicester; S. S. Platt, Rochdale; Pickering, Nuneaton; Barber, Islington; Britton, Burnley; F. Baker, Middlesbrough; H. Yarwood, C. Sheard, Heaton Morris; F. Massie, Wakefield; A. Shirley, Eccles; A. Sutcliffe, Featherstone; W. Dunscombe, Chesterfield; F. Fenn, Toothill (Upper); S. Edmondson, Burnley Rural; W. Spinks, Leeds; J. Parker, Nottingham; Hooley, Manchester; J. A. Settle, Bolton; E. Sykes, Cheadle; W. H. Traver, Wavertree; W. H. Hopkinson, Keighley; H. Dearden, W. H. Smith, Carlisle; and others.

The Mayor offered the members of the Association a very hearty welcome to Stockport.

On the motion of Mr. Brierley (Newton-in-Makerfield), seconded by Mr. Platt (Rochdale), Mr. Button, of Burnley, was unanimously re-elected Hon. Sec. for the Lancashire and Cheshire district. Mr. Button suitably acknowledged his reappointment.

The President (Mr. A. M. Fowler) then delivered an address on the Stockport sewerage scheme. Having described the position of Stock-

port and the difficulties connected with the work of sewerage, Mr. Fowler said that, having regard to the pollution of the districts immediately above them, Stockport had ordered the new intercepting sewers and works to be designed so as to provide for the collection and disposal of the sewage of the immediate districts if found desirable or necessary. In designing the scheme many special conditions had to be provided for. The town from the river on each side, whilst the river itself might be described as a sluggish stream. The existing sewers converged into main sewers at eighteen different points into the river. All these were to be intercepted and connected by the new scheme. The main sewer had had to be laid along the lower part of the valley, nearly parallel with the river, terminating at land about $1\frac{1}{2}$ miles below the fringe of the town, and would vary in size from 7 ft. diameter to 18 in., having a total length of about $4\frac{1}{2}$ miles. The Corporation had secured 95 acres of land of a character and site which was all that was to be desired. This land was a level which necessitated the pumping of the sewage to a height of some 17 ft. The expense of this being a continual cost, and seriously affecting the revenue account, it had been a matter of concern to mature the scheme so as to reduce the pumping to a minimum lift, securing also a velocity in the flow of sewage, in time of drought, of upwards of 2 ft. per second, to ensure cleansing. The gradients did not offer this provision with the ordinary-shaped sewer; but by narrowing the middle part of the invert the object thus sought had been obtained. The population extending on both sides of the river, the stream had had to be passed under in four places, and in two places, viz., at Brinksway bridge and Carrington bridge, inverted syphons had been resorted to, while at the other crossings special means had had to be adopted to prevent this by flattening the tubes so as to keep the gradients to an inclined plane, at the same time securing the full capacity of the sewer. From the precipitous nature of the land on each side of the river great volumes of rain-water were discharged through the existing sewers into the river, which he had no doubt in certain periods, as in thunderstorms, would discharge upwards of 50,000 gallons per minute. It was impossible to make provision for such storms, as this would dilute the ordinary flow of sewage during the active part of the day, above seventeen times the dry weather flow, it was, therefore, arranged to intercept at such periods the sewage and rain when it was diluted to eight times its bulk, or nine times the normal dry weather flow. To secure this provision special designs had been made to pass off the flood-water by means of weirs so regulated as to admit this amount through an opening at its approach to the weir into the sewer, and when the flood exceeded this quantity the whole would leap forward into the river. The main sewer at its invert would be lined with blue bricks, and at the sides with best chequer bricks. Ventilators would be placed at about every 100 yards apart, and shafts would be taken up the buildings well above the apex of the roof, and away from any windows or openings. All the brick sewers would be easy of access for inspection from end to end by the special arrangement of footway, and side entrances and manholes would be provided. The depth of the sewer below the surface varied from twenty feet, being principally through red sandstone rock. The outfall works were about fourteen miles distant from the town on its western side. About seventy acres of the land was moderately uniform in the surface, the remaining twenty-five acres being at a higher level of 36 ft.; the strata was principally gravel and sand to a depth of upwards of 20 ft. To utilise this land the sewage would be lifted by means of centrifugal pumps in duplicate to a height of about 17 ft. The sewage in its way through the pumping-house would be incorporated with a mixture of cream of lime and sulphate of alumina in such proportions as the density of sewage might necessitate to secure precipitation of the flocculent matter in tanks into which the sewage would be discharged, and allowed to flow either constantly or intermittently. The tanks would be eight in number, 76 ft. long and about 44 ft. wide at the top. The tanks were so constructed that the sewage could flow through the whole of them, or one, or any number, so as to have the full benefit when required of the whole reservoir space. The mud would be lifted from the well automatically by means of Shone's ejectors into the press-house of the building, where the same could be pressed into hard cake, so as to be in a portable form for quick removal. After the sewage had been treated by precipita-

tion, the effluent would be passed over the land by means of one main carrier fitted with sluices, to be discharged into branch-surface carriers, discharged intermittently into four or five acre plots. The ground would be underdrained, which would carry off the thus treated sewage into the main sewer again below the point where it had been pumped. To carry out the above arrangement it had been necessary to resort to the best possible known pumping machinery, and he had, therefore, adopted Messrs. J. & H. Gwynne's, Hammersmith, combined engines and centrifugal pumps at a cost of 4,725^l. The plant comprised a pair of 27-in. invincible direct-acting centrifugal pumping engines, each able to deliver 13,500 gallons per minute against a maximum head of 19 ft. He thought it would be found when these machines were started that the Corporation would have one of the most economical sewage pumping installations in the United Kingdom. The engines would be each equal to 60 h.p. The boilers were made by Mr. T. Oldham, of Stockport, and were of the Lancashire type, 30 ft. long by 8 ft. diameter, fitted with Green's economiser. The buildings were so laid out, that should any cheaper or better means be found of treating the sewage, they could be adopted to any process. Mr. Fowler next described the Mersey Mill bridge, which has recently been constructed by the Corporation. The work was the development of a great sanitary improvement, and an improved means of communication between the north and south sides of the borough. On the south side of the river an extensive rookery of dilapidated and insanitary property had been removed, and the ground had been filled up to the extent of 8 ft. to form approaches to the bridge on the south side, and 20 ft. on the opposite side of the river. The bridge was 80 ft. span, and 54 ft. between the main girders, built on the tubular lattice parallel girder principle. The whole of the structure proper was of mild steel, with planted mouldings of cast-iron to cover the top and bottom beams. The main girders have lateral diagonal bracing, 3 in. by $\frac{1}{2}$ in., built to stiffen them. There are eighteen transverse girders, laid 5 ft. apart, surmounted with a boiler plate flooring three-eighths of an inch thick. These transverse girders are suspended to the under side of the main girders by steel one and one-eighth inch bolts at each end. Each bolt is calculated to withstand a safe load of 7 tons, or one-quarter of the breaking weight, so that the suspension-bolts to each transverse girder would carry 84 tons. The total cost of the bridge was 10,640^l, and the work was carried out conveniently, economically, and without accident.

Municipal Progress at Stockport.

Mr. John Atkinson, A.M. Inst. C.E., Borough Surveyor of Stockport, next delivered an address on "Municipal Progress at Stockport."—The first part of his address, dealing with the history, the principal manufactures, and the geology of Stockport, after which a short account was given of the stables at Portwood Cattle Market, which were erected in 1891, and had cost 5,681^l 15s. 0d. On the subject of baths, Mr. Atkinson said that a small public swimming-bath and washhouse was built about 1857, but in 1888 the present buildings, consisting of plunge, slipper and Turkish baths, were erected. The old plunge-bath was adopted as part of the scheme, and is utilised as a "penny" boys' swimming-bath. As is the case elsewhere, the baths fail to pay. The average loss on the Stockport Institution is about 200^l yearly. The total cost of the buildings was about 10,400^l, and the architect was Mr. J. C. Prestwich, of Leigh, Lancashire. The Turkish baths comprise three hot rooms, shampooing and cooling rooms, the latter for smokers and non-smokers, with ten separate dressing-boxes. The Turkish baths are well patronised. The annual number of persons using all classes of baths average 80,000. The technical school at Stockport was transferred as a free gift to the Corporation on June 7, 1892, the total value of the premises and fittings being 16,874^l. The Corporation have since built an additional wing—viz., large class and examination room, small class-room, master's room and museum, and have covered a portion of the yard, the value of the additions being nearly 3,000^l. Mr. George Sedger, of London, was architect; and Messrs. T. & W. Meadows, Stockport, contractors. In dealing with isolation hospitals, Mr. Atkinson said that the Great Moor Hospital was erected in 1880. The building cost 4,635^l, and the site cost 1,346^l. The site contains 3 acres and 1 rood. The building consists of north and south pavilions, and covered corridors at west

side, with administrative block in centre. The old disinfecting stove being useless, it was decided in 1892 to erect a modern one in a suitable building, together with bath-rooms. This was done, and the building has been used continuously since June 30, 1893. The cost of the work, including a few pounds for rearrangement of drains, &c., in grounds and old washhouses, was about 800^l. All infected bedding and clothing, both from the hospital and from patients' residences, is disinfected by steam at a temperature of 260 deg. Fahr., hot air being afterwards drawn into the stove to dry the articles. The apparatus is that known as the "Nottingham Disinfecter," the makers being Messrs. Goddard, Massey, & Warner. All convalescents are obliged to have a bath before going home, and persons accompanying infection cases to the hospital are treated in a similar manner. In 1892 an estate on the north side of the town, 52 acres in extent, with mansion and farm thereon, was purchased for 7,500^l. The house has since been fitted for hospital purposes (Whitehill Hospital), and is intended to be used for the complete isolation of small-pox cases. The work of scavenging and refuse disposal, sanitary farms and tips, is under the Sanitary Committee, and in charge of the Chief Sanitary Inspector. The refuse is disposed of by burying and by raising the original surface of the land at the following places, viz.:—Newbridge Estate, Depot, area four acres; Warth Meadow Estate, parts of; Whitehill Estate, parts of. At the first-named the refuse banks are planted when completed, and the refuse is also filled into the deep holes made by excavating red rock sand for ironfounders, &c. At the two latter the low-lying areas are filled, and the raised land afterwards placed under cultivation. Since about 1884, the question of new streets and bridges, street widenings, and clearance of insanitary property has had unremitting attention, very large sums of money being expended, and still further proposed to be spent. The loans already taken up for above purposes exceed 73,000^l, and sanction for the further borrowing of 43,000^l has been applied for. The most important new street, which also necessitated 30 ft. of filling, is the continuation of Wellington-street from Hillgate to Churchgate. Almost all the main roads to the centre of the town are being widened. Two new bridges have been built—Millgate Bridge to Cattle Market and Heaton, and Mersey Bridge from Chestergate to Heaton-lane—and Lancashire Bridge widened, all from the designs of Mr. A. M. Fowler, the President; Park Bridge widening—part of the completed scheme of Great Portwood-street improvement—has been carried out from Mr. Atkinson's plans. In consequence of the various improvements, much insanitary property in the central portions of the town has been demolished. The town was fairly well sewered, so far as main outlets at right-angles to and flowing into the rivers are concerned, during the "Cotton Famine" in 1864, from the plans of the late Mr. J. Brierley, C.E. Much of the work was executed by, and was undertaken to provide employment for, the cotton operatives. Since the above year the Corporation have extended the main lines, and the minor sewers have been put down when new streets have been completed. Being an ancient town, a few obsolete forms of sewers exist, but these are being gradually reformed. Ventilation is by surface-gratings, assisted by about forty 6-in. by 4-in. shafts (and a few 6-in. round) up high gables, &c. Several automatic flushing-tanks are also provided. Their President, Mr. Fowler, is engaged upon the design and execution of a complete system of main intercepting sewers and sewage purification, estimated to cost 95,000^l, in addition to over 16,000^l paid for Heathside Farm, Cheadle Heath, the site of the works. Mr. Atkinson is also designing some miles of subsidiary sewers for roads where no sewers exist, to enable property connections to be made more economically than would be the case if owners were compelled to connect to the shafts placed at intervals upon the intercepting sewers. The provision of pipe or brick sewers will also be needed to prevent pollution of watercourses supplying motive power to manufactories, and for considerable portions of the outer parts of the Borough, which, being unbuilt upon, have not hitherto needed such provisions. House drainage is affected mostly from the back, each dwelling built latterly having a separate connexion to the main sewer in the 9 ft. passage, or back street, constructed in pursuance of the 1890 Public

* The internal walls have a facing of best white enameled bricks with salt-glazed dado.

Health Amendment Act. This sewer, serving, perhaps, two blocks of property (rarely exceeding ten to twelve houses in length) is trapped before entering the main street, and several ventilating shafts are fixed upon its length from the upper parts of the house drains by the builders, at their own expense. Fifteen telephonic fire-alarm boxes are placed throughout the town, thus enabling information to be conveyed to headquarters very speedily. There is a free library, containing 25,000 volumes, with reading-room and reference library attached. About one and a half miles of new streets are laid out, and three to four hundred new houses erected per year. About the same length of streets are paved yearly under the 150th section of the Public Health Act, 1875. All streets are lighted at ratepayers' expense. The lamps throughout the borough average 60 yds. apart, at those erected in recent years are placed about 30 yds. apart. Cost per lamp, 4*l.* 10*s.*; cost of maintenance, 2*l.* 15*s.* 3*d.* per year. The population has increased by about 1,000 per annum since 1881. Complete books, forms, and notices are kept in the building department, to record every stage of progress. Street nomenclature has received drastic attention, 250 duplicate names being altered in 1892. The Ordnance maps, scale 25 in. and 5 ft. to the mile, have been revised, and the Ordnance Survey Officials are about publishing the new sheets. The Highway Board, St. Petergate, has been remodelled, paved, drained, &c. Two companies own and work the trams in the town, whilst Stockport is particularly well served by the London and North Western, Cheshire Lines, Midland Railway, and other companies, and the Sheffield Company's tram. There are seventy-five miles of roads, of which over fifty miles are maintained out of the rates. The public highways are well paved with granite or grit sets, with Lancashire flags, cement, asphalt, or blue tiles on footpaths. There are only six miles of macadam roads, and but an insignificant length of boulder, or "petrified clay" paving. About seven or eight miles of private streets need paving. Materials now used in paving private streets are fine machine-cut flags in footpaths (or "Best Barns," in important roads), 5-in. edgings, and blue or brown "Lonkey" sets, all from Lancashire quarries. The cost is about 4*s.* per yard of surface, excluding the value of grouting paving with boiling asphalt and limestone chippings, amounting to about 4*s.* per yard of frontage, and which is defrayed out of the rates. Over thirty public urinals have been erected by the Council. These built lately are faced with Accrington "stock" bricks in panels and pilasters, have one or salt-glazed plinths, heavy stone coping, and are lined with slate slabs (with small joints of slate) and salt-glazed bricks. The cost per stall for this class of work is about 12*l.* 15*s.* The Corporation are the owners of 2,000 acres of land in their estates, properties, &c., a "purchase" value of about 120,000*l.*, and a rental of 760*l.* per annum in chief rents. The amount of loans taken up for street improvements, bridges, parks, sanitary, sewage, and other purposes since 1890 is over 200,000*l.*, and application has been made for about 43,000*l.* more. Mr. Atkinson also spoke of the Stockport parks and recreation-grounds, the market and grounds, and the gasworks. Mr. T. de Courcy Meade, Manchester, in proposing a vote of thanks to Mr. Fowler and Mr. Atkinson for their papers, remarked, reflecting the sewage works, that it was not always wise to criticise works which were in progress either adversely or favourably. Although, however, in this case there was no adverse criticism, because the scheme, as a whole, had been well and carefully thought out, all the details. He knew the difficulties were very great; but though he resided in the neighbourhood of the works he did not fear any estimate therefrom. Mr. Atkinson's paper would be a useful addition to their annual volume of proceedings. Mr. Barber, Islington, who seconded, asked the depth of the gravel at the sewage farm, and the deflection caused to the bridge by the bog-load. Mr. Baker, Middlesbrough, said he was in favour of vertical walls for settling-tanks. The vote of thanks having been accorded, the President, in reply, said the depth of the bed at the sewage works was 20 ft., and the deflection of the bridge was a little over a quarter of an inch over the whole length of it. Mr. J. T. Eays, West Bromwich, moved a vote of thanks to the Mayor. Mr. Mawbey, Leicester, in seconding, congratulated Stockport upon having secured the

services of one of the oldest, ablest, and most valued members of the Association. The vote of thanks was accorded and acknowledged by the Mayor. During the afternoon the members visited the outfall sewage works, the steel lattice tubular bridge across the River Mersey, and the new stables.

THE LONDON COUNTY COUNCIL.

The London County Council resumed its weekly sittings on Tuesday after the Easter recess, at the County Hall, Spring Gardens, Mr. Arthur Arnold, Chairman, presiding.

Blackwall Tunnel Works.—Mr. John Burns, M.P., asked if there was any truth in the statement that there had been a serious accident at the Blackwall Tunnel.

The Chairman said that he had received from the Engineer of the Council the following report:—"A rumour is current that a serious accident has occurred at the Blackwall Tunnel, involving the death of twenty men. I have the pleasure to contradict this. There was, however, an unusually large influx of water, about four o'clock this morning, which has been got under, and the men are again at work."

Wellington-street Widening, Strand.—The adjourned report of the Improvements Committee related to the proposed widening of Wellington-street, Strand, on the eastern side. The report concluded as follows, the recommendation being agreed to after some discussion:—

"In July last we advised the Council to acquire the whole site, and to sell for purposes of reclamation the surplus land not required for the improvement. We suggested that course because at that time the National Telephone Company would not sell less than the whole site. But now that the company are prepared to sell the strip of land required for the improvement, we are strongly of opinion that it will be better for the Council to purchase only that piece of land than to enter upon a scheme of speculative reclamation involved in the acquisition of the whole site. We consider that the amounts asked by the Duchy of Lancaster and the National Telephone Company are reasonable, and that the terms of the offers should be accepted by the Council. Wellington-street at its junction with the Strand is at present 64 ft. wide, and the Strand at this point has a width of about 68 ft. By the improvement proposed the corner of Wellington-street would be rounded and the width of the Strand at this point would be increased to about 80 ft., thus providing relief for the traffic which is constantly congested at this spot. . . . The present opportunity for carrying out the improvement at a comparatively small cost by the acquisition of vacant land free from any trade interest is a very favourable one, and should, we think, be seized by the Council. The Council is, we believe, convinced of the necessity of widening Wellington-street and the Strand, and it is hardly necessary for us to urge the importance of the work. It is right, however, to state clearly that if the present very favourable opportunity for carrying out the improvement is not taken, an expenditure of seven or eight times the present cost of the improvement will have to be incurred in the near future, when, as is inevitable, the improvement has to be carried out under the ordinary conditions of compensation. We recommend—

"That, subject to an estimate being submitted to the Council by the Finance Committee as required by the statute, the Council do accept the offer of the Duchy of Lancaster to sell to the Council for 10,000*l.*, and upon the conditions (a) to (c) inclusive set out in this report, and the offer of the National Telephone Company to sell for 6,000*l.* their interests in the strip of land at the eastern corner of Wellington-street, at its junction with the southern side of the Strand, and shown upon the plan submitted to the Council by the Improvements Committee, and to carry out the improvement as shown upon the plan; and that the solicitor be instructed to give legal effect to the arrangement with the Duchy and the company."

The Works Committee and the Cost of Work.—The report of the Works Committee was presented. This gave the cost of completed works as 178,862*l.* and the total of corrected estimates as 176,060*l.*

Mr. Boulnois, M.P., moved that the consideration of the matter be postponed for a week, on account of its extreme importance. It was one of the most serious reports ever given to the Council, for it was practically a condemnation of the Works Department by its own Committee. The Unionists had all along contended that they were right in their assertion that the Works Department would be a failure, and the report justified the attacks they had made.

Mr. Burns, M.P., seconded the motion, which was carried.

London Building Act, 1894.—The Report of the Building Act Committee contained the following paragraphs, the recommendation being agreed to:—

"We have to report, for the information of the Council, that the Tribunal of Appeal has formally signified its concurrence, as required by the London Building Act, 1894, with the regulations made by the Council on March 26 last, under Section 123 of the Act, prescribing the course to be followed by applicants for permission to erect or adapt dwelling-houses on low-lying land."—"We have to report that Messrs. Edell & Gordon have appealed on behalf of Mr. W. Hicklin, under Section 28 of the London Building Act, 1894, to the Tribunal of Appeal, against the certificate of the superintending architect defining the line of buildings on the north side of Prince George-road, Stoke Newington. The Council is empowered, under Section 181 of the Act, to defray the expenses of supporting by counsel and witnesses before the Tribunal any decision of the Council or of the superintending architect; and we recommend—

"That the solicitor do attend and support before the Tribunal of Appeal the certificate of the superintending architect defining the general line of buildings in Prince George-road referred to in the notice of Messrs. Edell & Gordon on behalf of Mr. W. Hicklin."

The Thames Embankment.—Mr. Ward, Chairman of the Works Committee, replying to criticisms as to the manner in which that body was repairing the roadway of the Thames Embankment, said it had not been able to employ more men on the work, as the length of the sections in hand at a given time was limited by the space between any two roads opening on to the thoroughfare. It had not been considered advisable to repair the road in longitudinal sections, as the steam-rollers on the half being dealt with would have frightened the horses on the half left open to traffic. The work would be finished in about a fortnight.

Insanitary Screens, Kensington.—Reports of Committees being disposed of, the following resolution was agreed to:—

"That it be referred to the Building Act Committee to consider and report whether means should not be taken to procure such a change in the law as will effectually prevent the erection of such insanitary screens as were lately put up in the rear of certain houses in Cheniston Gardens, Kensington, and which the Council, to their regret, found themselves unable to interfere with under the existing law."

The Council adjourned at seven o'clock.

THE SURVEYORS' INSTITUTION.

In the Professional examinations, 1895, of this Institution, the following Student-Candidates have passed the examination for the Professional Associateship:—

H. Adams, Barnsbury; H. E. Bentley, London; T. D. Berry, jun., Wandsworth; P. S. Bidwell, Ely; F. J. L. Birch, Mangeron, Melplash, R.S.O.; Dorset; G. H. Bradwell, Nottingham; A. S. Cartwright, Middlewich, Cheshire; C. Chart, Mitcham; D. G. Chattell, London; W. S. Cowper, Tunstall, Sittingbourne; K. N. Crowther, Clapham Common, S.W.; T. H. Driffell, Harrogate; E. S. Evans, Ealing Common, W.; E. C. Foster, London; H. F. Funnell, Camberwell; J. S. Garraway, Uxbridge; G. L. Hankey, Epsom; W. R. Hicks, Hampstead; E. W. Hooper, Bruton, Somerset; H. B. John, Cathays, Cardiff; C. J. Lake, Crouch Hill; S. E. Lakin, Edgbaston; W. T. Lamprill, Stratford; C. G. Lovegrove, Potters Bar; G. E. Luck, Crouch End; J. W. Paul, East Finchley; W. S. Protheroe, Leytonstone; C. S. Sandford, nr. Sheffield; A. C. Skingle, Brixton; C. G. Smith, Stamford Hill; C. H. Southorn, Leamington Spa; *W. S. Walker, Sydenham Hill; H. J. Watson, Petworth, Sussex; W. E. C. White, Kirby Lonsdale, Westmoreland; W. White, jun., Newcastle-upon-Tyne; W. Whitton, Forest Gate; S. A. Wilde, London; W. Young, St. Albans.

The following Non-Student Candidates have also passed the Examination for the Professional Associateship:—

W. H. Aids, Basingstoke; P. Allen, Croydon; T. J. Anderson, London; F. S. A. Banks, Stamford-hill; W. B. Boord, Waterloo, East Witten, Middleham, R.S.O.; P. F. Brooks, London; J. M. Brooks, London; A. Burton, jun., Wilmslow, Manchester; R. P. Butler, Downton; H. B. Campbell, Merton, Theoford; T. Corfield, Brockley; D. Eglington, Reading; P. B. Evans, Farnborough, Fulham; H. C. Farmer, Bedford-park; G. S. Fleetwood, Highgate; H. M. Foster, London; T. S. Fraser, Glasgow; G. E. Gregson, Preston; F. W. Hall, Oakham; T. B. Hall, Birmingham; A. J. Hardwick, Bromley; A. Harrison, Stockton-on-Tees; C. H. G. Harrison, Downton; F. C. Harvey, Wimborne; S. S. Haywood, Accrington; W. P. Horton, London; L. L. Jackson, Garstang; A. P. Jenkins, Redruth; W. Keay, Leicester; W. H. Kensley, Woodford Green; J. W. Kirk, London; M. P. J. Laumann, Bracknell; E. E. A. Lee, Highbury Hill; W. M. Lewis, Berw, Pontypidd; R. W. Menmuir, Lancaster; H. M. Messenger, East

* Special Prize, 1895. † Institution Prizeman, 1895.

‡ Driver Prize, 1895, and Penfold Silver Medal, 1895.

Croydon; H. Nuttall, Bury; W. Parks, Bexhill; H. J. Pearson, Brixton, S.W.; F. O. Piercy, Lowthorpe; C. J. Purvis, Sevenoaks; G. H. Pye, Stockport; J. C. Scrivener, Tunbridge Wells; J. H. Shuffelbotham, Kingston, Taunton; E. Smithells, Rivington, near Chorley; A. C. Standen, Streatham; W. M. Temple, Bedale; H. B. Vinten, Ramsgate; P. J. Waldram, Charing Cross; A. Worthington, Stockport; E. Youatt, St. John's Wood.

The following Professional Associates have passed the Fellowship Examination in Division IV.:-

J. W. Aris, London; L. H. Bailey, Reading; T. H. C. Bannister, Haywards Heath; E. J. Belcher, Wantage; G. W. Booth, London; J. W. Bradley, Nelson; H. G. Bradshaw, Manchester; T. E. Carr, York; T. G. Chambers, London; A. W. Cooper, East Croydon; A. C. M. Cross, London; C. F. Davies, Llanwrda, R.S.O.; E. W. Eason, London; A. E. Ellis, Exeter; F. G. B. Eves, Uxbridge; S. Ford, London; G. German, jun., Asby-de-la-Zouch; P. G. Grover, Dover; E. J. Heward, Brockley; P. C. Holiday, Bicester; C. H. Hooper, Swanley; F. W. Jarman, Croydon; J. Jenkinson, Richmond; J. R. Lancaster, Putney Hill; W. A. Leaning, Denmark Hill; E. M. Longsdon, Bakewell; H. R. McCarthy, Highgate-road; H. E. Maddox, Hampstead; H. G. Martin, Littleport; S. Martin, Croydon; L. O. Mathews, Birmingham; M. C. H. Norcolds, Saffron Walden; J. N. Norman, Putney; G. L. Pain, Camforth; H. Pearson, Beckenham; C. E. Powell, Oakhampton; H. E. Prall, Dartford; F. B. Smith, Wyke, near Ashford; H. W. Taylor, Newburn-on-Tyne; D. T. Thring, Chippenham; J. B. Watson, Brightwell, Tetsworth; W. H. Wells, London; C. H. E. West, Finchley; A. G. Woods, Hounslow; J. W. Wyles, Wanslett.

The following candidates have passed the direct Fellowship Examination in Division V.:-

A. O. Breeds, London; A. T. C. Fenn, Downton Castle, Ludlow; G. T. Field-Clarke, Colworth Estate, near Bedford; E. H. Leeder, Swansea; D. H. MacNicol, Mostyn; J. E. Miller, A.M.Ist.C.E., Sunderland; A. Murray, Romsey, Hants.

ARCHITECTURAL SOCIETIES.

MANCHESTER SOCIETY OF ARCHITECTS (INCORPORATED).—The annual general meeting of this Society was held at the house of the Literary and Philosophical Society, 36, George-street, on the 23rd ult., the President, Mr. John Holden, F.R.I.B.A., in the chair. After the annual report had been adopted, the following members were elected as officers and Council for the coming session:—President—John Holden, F.R.I.B.A.; Vice-Presidents—John Ely, F.R.I.B.A.; R. Knill-Freeman, F.R.I.B.A.; Hon. Secretary—Paul Ogden, F.R.I.B.A.; Assistant Hon. Secretary—Edward Hewitt, F.R.I.B.A.; Members of Council—R. I. Bennett, F.R.I.B.A.; A. H. Davies Colley, A.R.I.B.A.; T. Chadwick, A.R.I.B.A.; R. Knill-Freeman, F.R.I.B.A.; F. Mee; J. D. Mould, A.R.I.B.A.; W. A. Royle, F.R.I.B.A.; E. Salomons, F.R.I.B.A.; J. H. Woodhouse, F.R.I.B.A.; T. Worthington, F.R.I.B.A.; Members of Council (Associates)—J. S. Hodgson; H. E. Stelfox, A.R.I.B.A.; P. S. Worthington, A.R.I.B.A.; Auditors—J. W. Beaumont, F.R.I.B.A.; C. H. Heathcote, F.R.I.B.A.; Education in Architecture Committee—A. H. Davies Colley, A.R.I.B.A.; John Ely, F.R.I.B.A.; F. Mee; J. D. Mould, A.R.I.B.A.; G. H. Willoughby, F.R.I.B.A.; J. H. Woodhouse, F.R.I.B.A.; P. E. Barker, A.R.I.B.A.; G. Brown; P. Hesketh, A.R.I.B.A.; J. S. Hodgson; H. E. Stelfox, A.R.I.B.A.; P. S. Worthington, A.R.I.B.A. Mr. C. R. Locke, Mr. Joseph Nodal, and Mr. Joseph Swarbrick were elected Fellows, and Mr. C. D. Rochester and Mr. F. J. Almond were elected Associates of this Society.

EDINBURGH ARCHITECTURAL ASSOCIATION.—On Saturday last the members of the Edinburgh Architectural Association visited the castles and churches of Crichton and Borthwick, under the guidance of Mr. Thomas Ross, F.S.A. (Scott.), architect. After inspecting Crichton Church the party walked to the castle, whose massive ruins stand on a height overlooking the river Tyne. This is one of those castles the nucleus of which was a simple keep, afterwards by additions developing into a castle on the courtyard plan, and the original keep still remains with all the later buildings, the erection of which probably extended over three centuries. Leaving Crichton the party walked to Borthwick Castle, a distance of less than two miles. The licence

to build Borthwick was granted by King James I. in the year 1430 to Sir William Borthwick, afterwards created Lord Borthwick. This was at the time when so many of the collegiate churches were building throughout Scotland, so that the architectural details bear a great resemblance to these. Borthwick Church, adjoining the castle, was also visited. On the motion of Mr. W. W. Robertson, F.S.A. (Scott.), President, cordial votes of thanks were accorded to Mr. Ross for leading the party, and to the gentlemen who had granted permission to the members to visit the various buildings.

ENGINEERING SOCIETIES.

CIVIL AND MECHANICAL ENGINEERS' SOCIETY.—At the ordinary meeting of this Society on the 25th ult., a paper was read by Mr. W. Cooper Penn on "Chain Making." A history of iron chain cable making was given; the first cables used by the English navy being made by Messrs. Brown, Lennox & Co., at the beginning of the century, and they remained until 1830 the only firm who supplied the navy with these articles. The method of manufacture was gone into, the various proportions of the links that have been adopted at different times was given, and the various forms used. The paper was well illustrated by diagrams, photographs, and samples of chains, some of which had been tested to destruction for the purpose of showing the soundness of the welds, and the quality of the material of which they were made. A discussion followed, in which Messrs. William C. Street, E. H. G. Brewster, A. C. Moffatt, and A. Williamson took part, with others.

Correspondence.

To the Editor of THE BUILDER.

"RATIONAL BUILDING."

SIR,—I turned with interest to Mr. Huss's translation of the article "Construction," in Mr. Viollet-le-Duc's "Dictionnaire Raisonné," to see how he had rendered into English the French expression "tas-de-charge," for which we have no equivalent in our language. He translates it (p. 120) "a flat bed," which gives no conception of its meaning. The "tas-de-charge" (which literally translated means a heap or pile of burden) is the term given to the series of courses of stone with horizontal beds placed at the springing of the ribs of a vault. Their object was 1st, to spread the thrust of ribs with varying pressures, and to avoid the risk of crushing, which with a single course invariably took place in early vaults; 2nd, to lessen the risk of slipping; 3rd, to bring the thrust well within the walls; and 4th, to keep down the cost of the centring. To explain my meaning—taking the vaulting of nave of Mr. Pearson's church of St. Michael and All Angels, Croydon (Plate 10 in my work on Architectural Drawing) it will be seen 1st, that the thrust is spread through five horizontal courses, all bonded well into the wall; 2, the skewback is at such an angle as to prevent slipping; 3, the span between the transverse ribs, 22 ft., is diminished to 19 ft., when the voussours begin; and 4, the centring required would be 8 ft. 6 in. high, instead of 22 ft. If Mr. Huss had put "a flat bed or horizontal course pile" it would better have expressed the meaning, a term which might in course of time have been reduced to "the pile" when speaking of a vault. The term "ancones" (p. 121) as a translation of "croisettes" is misleading, as that word is applied to the projecting bosses or ears, which in ancient masonry were used to move the blocks of stone. The term "croisettes" is given as an English word in Dr. Spiers's Dictionary, and might have been retained. Again, p. 121, "to adopt frankly the corbelling-out" is a better translation of "adopter franchement les encorbellements" than "to adopt the corbels out and out." Whilst bearing testimony to the great value which such a book is likely to have to benefit students, it is to be regretted a larger type was not employed. The smallness of the type is emphasised by the undue width of margin.

R. PHÉNÉ SPIERS.

THIN PARTITIONS.

SIR,—I did not maintain that a Spanish tabique possesses all the features of the Fireproof Construction Company's partitions, but when you referred to certain qualities of the latter as specially

commendable I thought the occasion warranted mention of the fact that those particular features are obtainable by a simpler means of construction generally known in England.

In saying that the kind of construction mentioned by me only compares with their own in point of thickness your correspondents understate the case and are evidently not prepared to bear the tabique, built of brick and plaster only, will, under suitable circumstances, stand the test of fire, and not cutting away the base. It all depends on the total height of the partition, and whether doors intervene or not.

When a "maestro" wishes to build a part between two main walls over a very weak floor shores up the latter from below and builds on top of a cantered fillet laid on the floor. When the partition is set, he removes the shoring, knocks out the fillet, the partition remains supported at the ends. A skirting fillet nailed the floor on each side prevents lateral movement. The method referred to shows how considerate a partition built in strongly-adhesive plaster did in its behaviour from an ordinary brick wall. It is not "bound to be a dead weight upon floor."

I have seen a warehouse which was simply rectangular shell with floors and roof, conveyed into suites of rooms, with corridors and cross walls of 2-in. tabique, and these have stood the wear-and-tear of a hotel where people are constantly going in and out with the heaviest class of luggage. I need hardly be said that in this work the frames (or linings) are put together in a difficult way to the English system. The frames run floor to ceiling, and the architraves planted on side form a channel into which the brickwork is built, so that the edges are stiffened. The chief defect of such partitions is that they far from sound-proof, and their inferiority to walls in point of warmth would in many situations be another, these defects being, I imagine, comparable from all thin partitions.

NORMAN WIGMORE.

APPOINTMENT OF CLERKS OF WORKS IN BRISTOL.

SIR,—Will you kindly favour the members of Association by inserting in your paper their approval with regard to the manner in which officers of works are appointed in this city. A well-attended meeting of this Association was held at No. 11, High-street, to consider the matter, which is of interest to the members as well as to others who have positions of equal responsibility. A resolution adopted expressing strong disapproval of any being appointed to superintend two or three different buildings at the same time.

Reference was made to the special meeting of Bristol School Board on March 29. "Mr. H. Gore questioned whether they were pursuing the right course, either the clerks of works were sufficiently vigilant, or the builders were careless in the use of materials—at all events the Board suffered in some way or other."

We can only say that in our opinion it is impossible for one man to do his duty as clerk of works to two or three buildings, situated in separate localities. This method, which is very general in Bristol, undoubtedly detrimental to the principles of building construction, and also discouraging a man of good abilities to hold himself responsible for work over which he has no full control. We sincerely hope the Bristol School Board and other public bodies will not adopt this "part system," but, by the employment of thorough practical men, who will devote the whole of their time and abilities to the supervision of the buildings which will be a credit alike to the architect, builder, clerk of works, and to the city generally.

THE SECRETARY,
Bristol Association of Clerks of Works and Builders' Foremen.

THE RECENT SALE OF BLOCKS.

SIR,—Referring to your paragraph in last week's edition, will you kindly allow me to state that the blocks sold were not the blocks known as "Bewick blocks."

The blocks known as the "Bewick blocks" are wood blocks engraved by Bewick, and used in illustrating his principal and famous works—"Bewick's Birds," "Quadrupeds," "Fables," "Memoir," and not the blocks used in illustrating the smaller and less-known works. The whole of the above blocks are in the possession of my family by the will of the late Miss Jane Bewick.

A memorial edition of the works of Thomas Bewick (five vols.) was published for us by Quaritch, of Piccadilly.

The few blocks engraved by the Bewicks sold last week, may be regarded as "pot-boilers" for illustrating children's books, &c. We have about 1,800 blocks engraved by them, and they only are known as the "Bewick blocks." April 30, 1895.

A. J. BEWICK WALKER.

* Penfold Gold Medal, 1895. † "Crawley" Prize, 1895.

BRICKS AND TERRA-COTTA.—XVIII.
STRENGTH.

The following table, compiled from various sources, gives the strength of several well-known bricks. In nearly every instance six bricks were experimented with, and the table gives the maximum and minimum stress recorded with reference to these. The actual stress to which the whole bricks were subjected, prior to their being cracked, crushed, is not, of course, strictly comparative, cause the dimensions of each piece were not the same. In order to make that clear, and so that the student may be enabled to see how far the ultimate crushing strength was affected thereby, we have deemed it advisable to state the precise dimensions of the bricks. This is useful, also, as demonstrating the difficulty, even with machine-made and pressed bricks, in obtaining an absolutely uniform size:—

In regard to those columns detailing the mean stress exerted on several samples of the same description of brick, these results are theoretically more important to the architect, as they are to a large extent comparable with one another. As indices of the actual strength of each particular kind of brick tested, however, they are not so satisfactory. For the two columns showing the maximum and minimum stress on individual bricks, We should always remember that there is a general tendency to "select" the specimens to be tested, even though they be described as "average" bricks. It is better, therefore, on these grounds, to take the minimum results as being the real strength of the materials as a whole rather than to use a "mean" result. Taking the figures as they stand, we note that the strongest bricks were those of the West Bromwich West Bromwich, which yielded the phenomenal result of 1,064.2 tons per square foot; and, glancing at the maximum and minimum results (referring to six bricks), we observe also that the

In another series of experiments for the same body the following results were obtained :—

Strength of Bricks.

DESCRIPTION.	DIMENSIONS.	STRESS, LBS.	MEAN STRESS OF SEVERAL SAMPLES OF EACH KIND.			
			Cracked slightly. Crushed.		Lbs. per square inch. Tons per square foot.	
			Cracked slightly.	Crushed.	Cracked slightly.	Crushed.
Inches.						
abon, red (no recess)	Max. 3'10, 8'7½ by 4'28	336,050	461,500	6,830	10,505	439'2
" " " "	Min. 3'10, 8'7½ by 4'28	102,500	271,300			
" " " "	Max. 3'08, 8'9 by 4'37	107,100	388,050	5,582	8,727	358'9
" " " "	Min. 3'04, 8'5 by 4'30	58,600	302,050			
ar Rugby, light brown (wire cut)	Max. 2'85, 8'9 by 4'20	107,500	373,200	2,047	4,725	131'6
" " " "	Min. 2'90, 9'0 by 4'25	72,400	255,100			
at Bromwich, blue	Max. 2'74, 9'03 by 4'36	378,600	680,200	8,531	16,549	548'6
" " " "	Min. " "	300,800	631,200			
" " " "	(another kind) Max. 2'80, 8'7½ by 4'32	168,000	367,500	4,054	10,125	260'7
" " " "	Min. " "	128,000	336,600			
White glazed terra metallic (recessed both sides)	Max. 3'10, 8'8 by 4'22	162,240	173,460	3,498	4,256	225'0
" " " "	Min. 3'16, 8'7 by 4'34	104,120	190,850			
" " " "	Max. 2'55, 9'01 by 4'30	187,500	400,680	3,812	10,215	245'1
" " " "	Min. " "	115,800	306,340			
ley Regis, blue vitrified (no recess)	Max. 2'85, 8'7½ by 4'20	238,400	425,200	5,997	11,230	358'6
" " " "	Min. " "	202,400	387,940			
ley, Birmingham, red (recessed one side)	Max. 3'20, 8'9 by 4'35	70,900	122,040	2,157	2,808	138'7
" " " "	Min. 3'25, 8'9 by 4'40	68,400	84,560			
penhead, Lanes., reddish brown (wire cut)	Max. 2'90, 9'0 by 4'20	161,100	228,400	3,356	5,516	215'8
" " " "	Min. 2'90, 9'0 by 4'27	100,600	194,700			
rester, "pressed" (recessed both sides)	Max. 3'20, 9'14 by 4'50	47,050	91,180	1,010	2,170	65'0
" " " "	Min. " "	37,180	55,820			
" " "builders"	Max. 3'20, 9'10 by 4'50	40,950	113,270	8,72	2,118	66'1
" " " "	Min. " "	33,840	50,890			
rester, red	Max. 2'65, 8'7 by 4'35	77,500	99,610	1,642	2,342	105'9
" " " "	Min. 2'75, 7'10 by 4'30	55,000	85,290			
gue, Whitland, S. Wales (slate debris)	Max. 2'34, 8'7 by 4'25	365,200	631,180	8,653	16,424	556'4
" " " "	Min. " "	255,200	531,200			
ingham, Dorset, red (wire cut)	Max. 2'60, 8'7 by 4'30	180,200	268,100	2,481	4,060	159'5
" " " "	Min. 2'60, 8'9 by 4'35	90,800	141,800			
ston Abbot, vitrified "granite"	Max. 2'80, 8'7 by 4'35	"	121,000	"	6,924	"
" " " "	Min. " "	"	231,000	"	"	"
St. Ives, Hunts, yellow (wire cut)	Max. 2'90, 8'7 by 4'10	88,600	172,600	2,114	5,781	135'9
" " " "	Min. 2'50, 8'8 by 4'20	51,000	91,910			

bricks tested between pieces of pine 8 in. in thickness. In the last article we gave our reasons for preferring the plaster of Paris treatment.

The late Metropolitan Board of Works caused many experiments on the strength of bricks to be carried out during the years 1859-1863. Full particulars will be found in the *Minutes of Proceedings of the Institution of Civil Engineers*, vol. xx (1866), pp. 98 et seq. The results are expressed in terms referring to the amount of pressure each brick sustained, instead of per square foot. The "best white" Suffolk bricks on an average crushed at 19'60 tons each; ordinary (Brimstone) Suffolks from 31 tons to 48'45 tons; Gault from 32'38 tons to 37'90 tons; best Farnham "rubbers," 15'70 tons; Gault wire-cut, 60'75 tons; and Wortley (Leeds) blue, 72 tons.

Amongst the numerous results given in the last-mentioned work is a table detailing some experiments on small blocks of stone, of the dimensions of an average brick, with "frogs" sunk therein, with a view to test the relative strength of stone and brick under similar conditions, in connexion with sewer-work. It was found that Portland-stone, on the bed, came out at an average crushing strength of 47 tons; ditto against the bed, 42'66 tons; Bramley Fall, on the bed, 91'33 tons; ditto against the bed, 52'66 tons; whilst Yorkshire landings resisted the utmost capacity of the press, with about 100 tons, both on and against the bed. These figures may be contrasted with those previously mentioned.

In another series of experiments for the same body the following results were obtained:—

Description of Bricks,	Pressure in tons to	
	Crack.	Crush.
Good London "Grey-stocks"	12'00	24'00
Red "Paviors"	14'00	25'00
Best-bricks, not fully burned	17'25	27'05
Three White-bricks, each	13'00	26'25
Four " " " "	16'25	41'00

There can be no doubt, however, that Staffordshire blue bricks are, as a rule, very strong: two

Bricks made of Middlesbrough slag, in a manner previously described, withstood pressure as follows:—Some taken from a stock three years

* "The Testing of Materials of Construction," 1888
p. 438.

old crushed at twenty-one tons each, others from a stock only four months old were crushed with nine tons pressure; thus showing, as in the case of certain cements with which they may be compared, that their strength increases with age, up to a certain point.

GENERAL BUILDING NEWS.

ASHBOURNE CHURCH STEEPLE.—The repair of the splendid steeple of Ashbourne Church (the Minister of the Peace), just completed, with the exception of rehanging the old bells, was not undertaken too soon. The stair-turret, and middle stage of tower (of earlier date than that above it) had opened considerably. The east and south walls of the upper stage carrying the spire had to be shored up from the floor of the church whilst the critical work of rebuilding this angle was carried on. Before commencing this work, the opposite walls were bonded together (permanently) with two tiers of rods of "Delta" metal; which is free entirely not only from rust but from the dangerous expansion and contraction of iron. Of the spire, the two lower stages were spreading, and there were large fissures, extending to a considerable height, on three of the angles. The top stone and cap were split from the expansion of the iron rod carrying the vane, which has likewise been now made of "Delta" metal. A great deal of stonework was injured or destroyed by the rusting of iron cramps and tie-bars, which had ceased to afford the requisite support. None of the carved or moulded work was even cleared, nor the general surfaces touched; but very large bonding stones were built in and large quantities of concrete were poured into the walls. Very nearly 5,000 cubic feet of stone were nevertheless required. The height to the top of the vane is about 218 ft. The beautiful bells, eight in number, the veritable peal which inspired those evening bells rung temporarily in their old cage, brought down into the churchyard, till funds shall be available for restoring them to the tower, in which they could now be rung with safety. The work took three years to execute, at a cost of very nearly 5,000l. The greater part of the work was carried on without a contractor, by Mr. Ralph Clifton, as building-foreman and clerk-of-works. The architect was Mr. William White, F.S.A.

THE THOMAS MUIR MEMORIAL HALL, PAISLEY.—The foundation stone of the Thomas Muir Memorial Hall, which is being erected in North-street, in memory of Mr. Thomas Muir, was laid on the 20th ult. The building consists of a hall 50 ft. by 31 ft., and 24 ft. in height. It is seated for 318, exclusive of platform. To the north of the hall are a class-room and committee-room, while in connexion with the lobby to the back are several class-rooms and a lavatory. The class-room and lavatory are connected by a movable partition. The main entrance to the hall is by a central door in front of the building. The style of the building is a simple treatment of early Norman, the front portion being formed of Lochbriggs red stone, while the other walls are built of brick, faced with terra-cotta brick from Braidwood. The contractors for the various departments of the work are as follows:—mason work, William Taylor, Paisley; joiner work, Angus Macdyeen, Paisley; slater work, James Gillespie & Son, Paisley; plumber work, Joseph Thomson, Paisley; plaster work, William Speirs, Paisley; brick work, Thomas McCaig, Paisley; steel roof work, Brownlie & Murray, Glasgow; glazing, A. Drummond & Co., Glasgow. The architect is Mr. Charles Davidson, Paisley.

RECONSTRUCTION OF THE THEATRE ROYAL, GLASGOW.—A lining, says the *Glasgow Herald*, has been granted to Messrs. Howard & Wyndham, theatrical proprietors, to restore and reconstruct the Theatre Royal, in Cowcaddens, Hope-street, and Rutherford-lane, Glasgow. Although the interior of the new house will be similar to that which existed before the fire, the plans provide for several important alterations in details which will conduce to the public safety and comfort. Mr. C. J. Phipps, of London, in his designs has had specially in view the prevention of fire. The auditorium and the stage will practically form two separate buildings. The gable which formerly divided the two parts will be allowed to remain and constitute the boundary of the auditorium. A new wall will be erected 10 ft. behind, and will form the boundary of the stage—thus giving practically a double proscenium wall, and avoiding contact between the roof of the auditorium and the roof of the stage. The whole of the opening of the stage will be filled up by a fire-resisting curtain. The present staircases will remain, but they will be roofed with concrete. The auditorium will accommodate about 3,000 persons, an increase of 500 on the old house. Three hundred seats will be added to the pit, and the gallery will be reduced in size to allow of a refreshment-bar being provided on the top floor. The boxes will remain the same, and will have emergency staircases leading to the street. The old horseshoe dress-circle will have less of a sweep, being brought nearer the stage. The corridors are to be of concrete, as well as the passages to the dressing-rooms and the dressing-room staircase, and the gallery and upper-circle stair will be covered with concrete at the top. The flies on both sides of the

stage are to have double iron doors. The roof of the auditorium is to be lowered 6 ft., and the depth of the stage is to be slightly less than formerly. The entrances to the theatre remain the same. Messrs. Morrison & Mason are the contractors.

CHURCH, FULHAM.—The Bishop of London on the 29th ult. consecrated the new church of St. Matthew, at Fulham, the foundation-stone of which was laid in October, 1893. The church is situated in the Wandsworth Bridge-road. The architect was Sir Arthur Blomfield. Red and yellow brick and white stone have been the materials chiefly employed, the roof being red tiled. The plan upon which the church was laid out comprises a nave and two aisles with chancel, to which an organ chamber and south aisle have been added, the whole providing accommodation for about 850 worshippers. Wood blocks form the flooring, while the seats, choir-stalls, and temporary pulpit are of pitch-pine. The vestries are placed below the chancel, a stone stairway being provided.

TECHNICAL SCHOOL AND FREE LIBRARY AT NELSON.—A new technical school and free library, erected by the Corporation of Nelson at a cost of about 10,000l. (exclusive of the site), was opened recently by Sir Philip Magnus. The buildings have been designed by Messrs. Holton & Fox, of Dewsbury, and are situated in Market-street and Ellen-street, in the centre of the town. The school, at some future time, constitute the south wing of the Municipal Buildings. The main entrance to the free library is from Market-street, and the building contains public reading-rooms, and accommodation for the reference and lending libraries. The lending library has accommodation for 20,000 volumes, and at present contains about 6,000. The technical school is also provided with accommodation for instruction to students in technology, science, arts, and other subjects.

UNITED METHODIST FREE CHURCH EXTENSION, MEERSBROOK, YORKSHIRE.—Memorial-stones of a United Methodist Free Church for Meersbrook have just been laid in Valley-road, Huddersfield, which will be of red brick, faced with stone, is to contain a large hall, 46 ft. by 30 ft. There will be two class-rooms, 15 ft. by 16 ft. Accommodation will be provided for from 350 to 400 persons. The architect is Mr. A. J. Greenwood, and the contractors Messrs. Wilkinson & Sons.

SCHOOL BUILDINGS, ARBURYDALE, SHEFFIELD.—On the 22nd ult. the new departments for girls and infants were opened at Abbeydale. The buildings previously erected comprise schools for boys and for junior boys and girls mixed, and the new schools provide for infants and senior girls. The departments for girls and infants are provided with four class-rooms each for sixty pupils, and two school-rooms. All the class-rooms can be seen by the head-teacher when in separate use, and they can be thrown into one auditorium with the school for exercises and meetings by means of the single action sash partitions. There are rooms for teachers and stores, cloak-rooms and lavatories under control for scholars. The accommodation sanctioned by the Education Department is for 782 scholars. The contractor for the general work was Mr. John Greenwood. The asphalt of the yards has been done by Mr. John Hadfield; the warming apparatus by Messrs. J. C. & J. S. Ellis. Mr. E. Cartwright has acted as clerk of the works, and the architect is Mr. C. Innocent Sherrin.

NEW BUILDINGS, CARDIFF GAS COMPANY.—The Cardiff Gas Company's offices in Bute-terrace are to be replaced by more convenient buildings. The designs for the new erection have been prepared by Mr. Henry Morley, the engineer, and the contract is in the hands of Mr. James Allen. The new building will consist of two stories, and it will be constructed of Newbridge stone with Bath-stone dressings. The ground floor is to consist of a large vestibule, on either side of which will be the general offices (52 ft. by 31 ft.) and show-rooms (36 ft. by 31 ft.), and there will also be large show-rooms, stores, secretary's offices, ledger clerk's offices, strong-room, and inspectors' offices. The second floor will consist of board-rooms (24 ft. by 31 ft.), engineer's office, clerks' office, drawing-office, laboratory, printing-press, and stores.

SCHOOLS, WOLVERHAMPTON.—On the 22nd ult. the Walsall-street new schools, connected with the Wolverhampton School Board, were opened. The schools consist of a free-story block of buildings, and provide accommodation for 250 boys, 250 girls, and 325 infants in the class-rooms, exclusive of the three halls. The infant accommodation is provided on the ground floor; the girls are placed on the first floor, and the boys on the top story. Each floor consists of a hall 52 ft. 6 in. by 30 ft. 6 in., facing Valsall-street, with five class-rooms opening out of the hall. The accommodation for boys and girls and the lavatories are provided at either end of the halls, also the rooms for the use of the head teachers, convenient of access from the staircases. Covered sheds are provided in the playgrounds, and a separate approach to each department is arranged for under the caretaker's house from St. James's square. The buildings are built in red brick, with terra-cotta dressings, and covered with brindled tiles. Internally the floors are formed of concrete on iron joists, on which are laid wood blocks to all the floors excepting the corridors, lavatories, and bat and cloak-rooms. These are finished in asphalt. The steps

are of York stone. The walls are plastered and coloured, with a cement dado. The woodwork is all best red deal, painted. The playgrounds are covered with tar paving, and the roofs of the sheds and lavatories are covered with zinc. The work generally, the contract for which was 9,825l. has been carried out by Messrs. Willcock & Co., contractors of Wolverhampton. The terra-cotta was supplied by Messrs. Dennis of Rubicon; the wrought iron gates and railings by Messrs. Brown & Co., Birmingham. The premises are heated throughout on the hot-water low-pressure system, with ventilating radiators admitting warm fresh air to each room. This has been fixed by Messrs. Killick & Cochran at Wolverpool, and the electric-lighting installation and fittings by Messrs. Scott & Co., of Birmingham. The whole of the work has been carried out under the personal superintendence and direction of Mr. T. H. Fleeming, of Wolverhampton, Architect to the Board.

COTTAGE HOSPITAL, BRIDGEND, GLAMORGANSHIRE.—The foundation-stone of the Cottage Hospital in course of erection at Bridgend was laid on the 24th ult. The building, which is designed to accommodate eight patients, comprises a ward for each sex, an isolation room, operating room, the usual domestic offices, and rooms for attendants and nurses. The contract has been let to Mr. Edward Pierce, Bridgend, at 1,500l., and the architects are Messrs. Lambert & Co., of the same town.

SCHOOL BUILDINGS, SHAFTON, YORKSHIRE.—In connexion with the Wesleyan Chapel, Shafton new Sunday-schools and vestries have been erected. The architect was Mr. Moxon, of Barnsley.

ADDITIONS TO ST. MARY'S COLLEGE, WOOLHAMPTON, DORSETSHIRE.—On the 27th ult. the foundation-stone of the new buildings erected in memory of the late Captain Joseph Boardman Haydock, by his widow, took place at St. Mary's College, Woolhampton. The new buildings, just completed at a cost of 10,000l., are, like the rest of the College, in the early Tudor style. The material used is red brick, but stonework is also employed. The main entrance, called the "Haydock Wing" is through a deeply-moulded archway, beneath a low square battlemented tower. Passing through the main staircase and the reception rooms, a short corridor brings the visitor to the "Haydock Hall." Close by the Hall is the refectory. On the upper floor of the new building are rooms for the rector, the professors, and the students, two large dormitories, and an infirmary. A stone-coped wall has been placed round the College grounds, and an entrance gateway erected. The architect was Mr. Frederick A. Walters, F.S.A.

ADDITIONS TO ST. SAVIOUR'S CHURCH, WALMER.—A Vestry Meeting was held at Walmer last week on the 19th ult. (the Rev. Henry Venn, M.A., presiding), when it was resolved to add a north aisle to St. Saviour's Church, with new organ-chamber and vestry, these enlargements being required to meet the demands of the rapidly-growing congregation. Designs had been prepared by Mr. Dinwiddie, architect, upon the ear's instructions, and have already received the approval with a grant by the Diocesan Church Building Society. Upon the motion of Admiral Douglas the plans were adopted and it was decided to proceed with the work forthwith.

NEW CHURCH OF ST. LAWRENCE, PARTON, NEAR PRESTON.—On Monday afternoon in last week the foundation-stone of the new church of St. Lawrence, Parton, near Preston, was laid by Viscount Cross, G.C.B. The new church, which is estimated to cost about 5,000l., is being erected to take the place of an existing building, which is unsuited to the purposes of Divine worship, and is being carried out from the designs and under the superintendence of Mr. R. Knill Freeman, architect.

HALL FOR PARISH CHURCH, DAILLY, Ayrshire.—On the 27th ult. the foundation-stone of a new hall for the parish church was laid. The hall, which was designed by Mr. Allan Stevenson, architect, Ayr, will accommodate 300 persons.

BATHS, SIDMOUTH, DEVONSHIRE.—New baths which have been erected on the Esplanade at a cost of 6,000l., were opened at Sidmouth on the 27th ult. There are reclining and deep baths, 1, Aix-les-Bains-room, and a swimming-bath. The club premises include a billiard-room, reading-room, smoke-room, card-room, and sleeping apartments with accommodation for the steward on the second floor. The cost of the new structure, which is to be called Christ Church, and is in the Late Decorated style of architecture, will be about 4,000l. Mr. R. Knill Freeman is the architect.

NEW CHURCH AT HEATON, NEAR BOLTON-Le-MOORS.—At Heaton, near Bolton-Le-Moors, last week Lord Stanley, M.P., laid the corner-stone of a new church which is being erected to replace an old structure. The cost of the new structure, which is to be called Christ Church, and is in the Late Decorated style of architecture, will be about 4,000l. Mr. R. Knill Freeman is the architect.

SANITARY AND ENGINEERING NEWS.

ENFIELD WATER SUPPLY.—At the ordinary meeting of the Enfield Urban District Council held on the 18th ult., the scheme for an improved water supply prepared by their consulting engineers, Messrs. Taylor & Crisp, of Westminster, was adopted, and it was resolved to apply to the Local Government Board for sanction to borrow 11,000l. for the execution of the scheme.

of the work. The works comprise the sinking of a new well through the tertiary formation, the laying of 300 ft. of headings in the chalk, and the provision of a new pumping-station, with engines in duplicate, of a total h.p. of 120.

FOREIGN AND COLONIAL.

FRANCE.—A monument to the memory of the landscape-painter Pélouse is to be erected in the Bois de Cernay (Seine-et-Oise), to be completed by next year. M. Falguère is the sculptor and Mayet the architect. The Government authorities intend to have an artesian well pierced at Vaux-sur-Seine. A new Hôtel de Ville is to be built at Vauves, as well as a covered market. Important pictorial decoration has been placed in the Salle des Fêtes of the Mairie of Montreuil, by Bourguier, an artist of talent, who was selected by a competition organised by the Conseil-Général de la Seine. The bridge at Poissy is to be built shortly, at the joint cost of the Ouest Railway and of the town of Poissy. The "Société Amis des Arts" at Calais is organising an exhibition to be opened on June 1 and remain until October. The Art Exhibition of Bordeaux is to be opened to-day (Saturday). A competition for the construction of a chapel at Arriz, in the quarter of the former Imperial manoir. The monument which has been proposed to Pierre Puget, the sculptor, at Marseilles, is to be erected in the Place de la Bourse. The "Pont Mirabeau," between the quarters of Issy and Grenelle, is to be opened this month.

MISCELLANEOUS.

CLERK OF WORKS APPOINTMENT.—We are glad to state that in answer to an advertisement in this issue for April 20, for a clerk of works for the Birmingham and Grange United District School, there were twenty-four replies, and the Board at its meeting on April 25 appointed Mr. Thomas Hamp, of Chatham, to the position.

ADDITIONS TO ALTAR, ST. MICHAEL'S AND ST. ANGELS' CHURCH, EXETER.—Additions have been made to the altar at St. Michael's and St. Angels' Church, Exeter, all being in oak. The work has been carried out by Messrs. Harry and Sons, who the masons have carved oak capit, from designs by Sir Arthur W. Blomfield, R.A.

WATER AND LEAD POISONING, HERCKMONT, YORKSHIRE.—The annual report of Dr. T. Broughton, Medical Officer of Health for Herckmont, submitted to the District Council at its meeting on April 25, has been printed, and contains a reference to the water supply of the township. This was stated to have been ample during the past year, but unfortunately the water on the lead service pipes. "I have spoken," Dr. Broughton, "on the subject before, but it is of such importance that I refer to it again. Water impregnated with lead in those who regularly drink it is an impaired state of health which is not easy to account for. I would still advise you to insist on other than lead pipes being placed in houses. The wrought-iron pipe lined with tin proved itself an ideal pipe, and water has no active action on it, and can be delivered to the consumer as pure and uncontaminated as at its source."

ANNUAL DINNER OF THE SHEFFIELD MASTER BUILDERS' ASSOCIATION.—The annual dinner of the Sheffield Master Builders' Association was held on the 25th ult. at the King's Arms Hotel, Sheffield. Mr. James Longden, President of the Association, occupied the chair. A statement laid before the meeting by the hon. secretary, Henry Chambers, showed that the Association has now a membership of sixty. The important matters dealt with during the year have been two actions taken on behalf of members against persons who had, on the advice of architects, retained money as damages for delay in the completion of contracts within a fixed time. In both cases the Association succeeded in enforcing payment. Action was also taken in connexion with the case "Sheffield Corporation v. Young and others," and the Association further been successful in inducing the Corporation to recall the use of earthenware pipes in place of the iron ones used by them. The most interesting consideration was the agreement existing between builders and their employers, which allows no appeal from the decision of the architect. Unsuccessful efforts have been made to induce the Sheffield architects to adopt the plan known as the London agreement, which, in case of dispute, reference is made to a third person, but the hope is expressed that some arrangement will shortly be made at which will do away with the cause of complaint that the Sheffield builders now have. Loyal toasts having been honoured, Mr. Joseph Longden gave "The City and Trade of Sheffield." His own trade, he said, had on the whole been employed, although not perhaps as well as might have been hoped. Referring to the subject of the speaker remarked on the great hardship it was caused to the wives and children of men. Soon he hoped they would obtain a relief by which these disastrous strikes could be

avoided. The existence of a board or boards of arbitration, composed of thoroughly competent men, would be a great blessing not only to masters but to the workmen themselves. Mr. C. Ross briefly responded. Mr. H. Brumby proposed "The Corporation," and Councillor G. Carr responded. "Success to the Master Builders' Association" was given by Mr. John Biggin, and responded to by Mr. John Spink and J. B. Corrie.

SANITARY INSPECTORS' VISIT TO THE SANITAS WORKS.—On the 26th ult., the members of this Association, to the number of about 250, paid a visit to the works of the Sanitas Company, Bethnal Green, on the invitation of the directors of the Company. Mr. Kingzett, the managing director (the inventor of Sanitas), conducted the party, and in a preliminary lecture, explained the chemical principle with which nature has endowed the pine, the eucalyptus, and a few other trees, and the manner in which this principle has been utilized in the manufacture of "Sanitas." In addition to the most ordinary forms of Sanitas, which, in its refined state, is a nearly transparent liquid of amber colour, aromatic, and non-poisonous; crude sanitas, sanitas powder, sanitas oil, and sanitas made into composites with slaked lime, sawdust, and other similar materials, were shown in different stages of manufacture. "Sanitar candles, Kingzett's "Sulphurators," "Sanitas Eucalyptus Disinfectant," and various other appliances for disinfesting with Sanitas were shown and explained. The visitors were entertained at luncheon in one of the warehouses. The toast of the day, "Success to the Sanitary Inspectors' Association," was proposed by Mr. Kingzett. Mr. H. Alexander (late Chairman of the Council of the Sanitary Inspectors' Association), Mr. Raymond (Hon. Treasurer), and Mr. E. Tidan (Hon. Secretary), responded to the toast. Mr. Tidan, in the course of his remarks, gave the members some interesting details with regard to the Sanitary Conference proposed to be held at Worthing at Whitsuntide. The Mayor, Corporation, and townspeople are preparing for the Inspectors a hearty welcome, and the railway company is behaving generously in regard to the trains and fares. Mr. Tidan concluded by proposing a toast to the continued prosperity of the Sanitas Company.

REEROS, SHARROW CHURCH, SHEFFIELD.—A carved oak reeredos and retable, Perpendicular in style, has been given to this church by a member of the congregation. The framework was designed by Mr. C. Hodgson Fowler, F.S.A., and the paintings were designed and executed by Messrs. Percy Bacon Bros., of London. The centre panel contains a representation of the Crucifixion, after Martin Schongauer. The four other panels contain various saints. The whole is on a gesso background, and highly gilded.

LEGAL.

ACTION FOR DAMAGES, FOR ALLEGED LOSS OF LATERAL SUPPORT, IN THE QUEEN'S BENCH DIVISION.

In the Queen's Bench Division on the 26th ult., the case of *White v. Heyworth* came on for hearing before Mr. Justice Wills, sitting without a jury, it being an action brought by Mr. Edwin White, a baker, formerly carrying on business at 60, Stamford Hill, against the defendant, Mr. W.W. Heyworth, to recover damages for alleged trespass, and for the loss of the lateral support to which he alleged he was entitled, by the pulling down of No. 62, Stamford Hill, the next house.

The plaintiff gave evidence to the effect that the profits in his business amounted to 6*l.* 10*s.* a week, and that in October last the defendant pulled down the next house, the result of which was that the wooden partition between the two houses was broken, upon which the rain poured into his house and practically swamped it, and in consequence of which he was obliged to leave.

In cross-examination he said that the premises were much shaken and damaged, and became unfit for human habitation. He had claimed 50*l.* for the damage done to his furniture, and 12*l.* for its removal, but it had been removed a month before the removal of No. 62 was pulled down to avoid an execution. He had refused an offer of 55*l.* from the defendant's solicitors, who also acted for the landlord, and had promised one of his creditors to pay him with the damages he would get in the action.

Messrs. B. N. Southall and R. M. Hiscocks, architects and surveyors, said that, in their opinion, the removal of No. 62 had destroyed the lateral support, and had endangered the building generally.

Mr. Heyworth, the defendant, was called, and stated that he acquired the lease of No. 62, and sold it to a Mr. Bright, "a house-breaker," to pull down. He told him to be sure not to touch the party-wall, and that the new house was to be built 7 ft. from it.

Mr. Bright said that the defendant warned him not to touch the party-wall, and he did not do so.

Messrs. J. Hamilton and J. Payne, architects and surveyors, gave evidence as to the plaintiff's house not deriving any support from the defendant's house, and that it, therefore, did not lose any.

At the conclusion of the evidence and the arguments of counsel, his Lordship, in giving judgment, said that there had been a great exaggeration on the

plaintiff's part. He could find no evidence of any interference with the plaintiff's right of support. The mere fact that part of his outer wall was now exposed to the weather instead of being the defendant's inner wall, could not give the plaintiff any cause of action, nor could he see any evidence of any loss sustained by him. The defendant would not be liable for Mr. Bright's trespass, if he committed one, but that was a matter which it was not necessary for him to decide. In these circumstances there would be judgment for the defendant, with costs.

Judgment accordingly.

Mr. E. A. Swan appeared as counsel for the plaintiff, and Mr. Forbes Lankester for the defendant.

ACTION TO RESTRAIN INTERFERENCE WITH ANCIENT LIGHTS.

THE case of *Sheen v. Diamond* came before Mr. Justice Romer in the Chancery Division on the 24th and 25th ult., it being an action brought by Mr. James Sheen, the owner of some stables, workshops, and premises, known as Nos. 244 and 246, Brick-lane, Bethnal Green, for the term of twenty-six years unexpired, and he claimed against the defendant—

(1.) A declaration that a certain brick wall dividing his premises (Nos. 244 and 246 Brick-lane), from the defendant's premises, No. 248 Brick-lane, belonged to him.

(2.) An injunction to restrain the defendant, his agents, servants, &c., from using or trespassing on the said wall, and from placing in staging or any other thing on or over the said wall or any part thereof on or any other part of the plaintiff's premises.

(3.) A Mandatory Injunction commanding the defendant to take down and remove all staging or other things affixed by him on or over the said wall or any part thereof.

(4.) An Injunction restraining the defendant, his agents, &c., from preventing or hindering the access of light and air to the plaintiff's windows or any of them.

(5.) A Mandatory Injunction commanding the defendant to take down and remove all such timber and other things erected by him which prevented or interfered with the access of light to the plaintiff's windows, or any of them.

There was also a claim for damages. The defence was a general denial of the allegations contained in the statement of claim.

After hearing a mass of conflicting evidence, his Lordship found as a fact that the windows of the plaintiff's building were ancient lights, and that at the time the action was brought the lights of two of the windows were interfered with by the defendants by the timber. Since that time the interference had ceased, but under the circumstances, seeing that the plaintiff's case was entirely challenged, and his rights to those lights challenged, the plaintiff was entitled to an injunction to restrain the defendant from erecting timber on his premises so as to interfere with the plaintiff's ancient lights. He thought that the costs of the action, so far as the action was one seeking relief in respect of ancient lights, would have to be paid by the defendant, and he made a declaration that the wall was not the plaintiff's property, as claimed by him. His Lordship also said that the Court did not think fit to grant the plaintiff any other relief but that mentioned. The rest of the action was dismissed, and the two sets of costs set off one against the other.

IMPORTANT POINT UNDER THE METROPOLIS MANAGEMENT ACT.

THE case of *Lavy and Another v. the London County Council* came before a Divisional Court of the Queen's Bench, composed of Justices Day and Wright, on the 1st inst.

Mr. H. F. Dickens, Q.C., and Mr. R. C. Glen appeared as counsel for the appellants, and Mr. Channell, Q.C., and Mr. Daldy for the respondents (the London County Council).

Mr. Dickens said that the case came before the Court on an appeal by way of special case from the decision of Mr. Horace Smith, the magistrate at the Clerkenwell Police-court, who had ordered a certain wall to be pulled down. The complaint against the appellants was that they had erected a certain structure beyond the general line of buildings in the City-road, the proceedings being taken under the Metropolis Management Act, 1862. He said that the appellants were the owners of a dwelling-house in the City-road, 38 ft. from the footway, there being a forecourt which had been bounded for many years by a brick wall 2 ft. or 2 1/2 ft. high, 9 in. thick, and with stone copings and iron railings 5 ft. 6 in. in height. Applications had been made by the appellants from time to time to build on the forecourt, but those applications had always been refused. A hoarding was erected on the dwarf wall against the railings for advertising purposes, and on February 13, 1894, the County Council gave the appellants notice to remove the hoarding under Section 13 of the Act of 1862 which deals with temporary structures, and it was removed and replaced by a wall 11 ft. high and 14 in. thick, which was the erection complained of. On July 11 a summons was taken out which was made returnable on July 24. The Architect of the County

VIEILLE MONTAGNE SOLE MANUFACTURING AGENTS.
NO SOLDER. NO EXTERNAL FASTENINGS.
Particulars on Application. Chief Offices: Fitzroy Works, EUSTON ROAD, LONDON, N.W.

Chief Offices: Fitzroy Works, EUSTON ROAD, LONDON, N.W.

The Builder.

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MAY 21, 1905.

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Palace for His Highness the Maharajah of Bhowanugger, India.—Mr. W. Emerson, F.R.I.B.A., Architect	Double-Page Photo-Litho.
Design for a Town Church.—By Mr. S. K. Greeniside, A.R.I.B.A.	Double-Page Ink-Photo.
Designs for Electric Light Brackets.—Modelled by Miss Esther M. Moore	Single-Page Ink Photo.
Casket for Address presented to Ex-Lord Mayor Knill.—Designed by Mr. J. F. Bentley, Architect	Single-Page Ink-Photo.
New Premises, Tottenham Court-road.—Mr. C. Fitzroy Doll, Architect	Single-Page Ink-Photo.
Cottage Studio at Northwood.—Mr. J. Nixon Horsfield, Architect	Single-Page Ink-Photo.

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Architecture at the Paris Salons.

As usual, the bulk of the architectural drawings are congregated at the old Salon in the Palais de l'Industrie, and the Champ de Mars Salon has but a small and unimportant collection of architectural exhibits to show. Probably one very practical reason why the architects, as a body, adhere to the old Salon is that they know there will be room to hang their drawings there, and they have no surance of that at the Champ de Mars, indeed, it is difficult to know where the range of large strainers (frames are not required for the architectural drawings) could possibly be found room for at the new Salon. This year the number at the Palais de l'Industrie—or, at any rate, the wall-space occupied by them—is rather larger than usual, the less worthy exhibits, which do not gain access to be hung in one of the three rooms, are banished to the gallery, occupying nearly the whole of one side of the latter, besides the usual space at the end and partly up the other side.

Unfortunately the superiority of the exhibition is rather manifested in quantity than quality. The set of drawings which form the *pièce de résistance* of the year's architectural exhibits are usually to be found ranged together in one of the three rooms of predilection. But there is nothing this year to fill the place occupied by M. Ledanne's splendid set of Pantheon drawings last year, or the remarkable sets of drawings of Cambodian architecture of M. Albe, and of other great remains of antiquity, which we remember in this position in previous years. The usualoup of central and predominant interest is wanting.

The set of drawings which come nearest supplying the deficiency are the "Études de Renaissance" by M. Pontremoli, a former pupil of MM. André and Laloux, and now at the Villa Medici. These are mostly geometrical drawings beautifully executed in water-colour, including the "Porta Pallio" in Verona, two tombs from Bergamo and Lucca, and various other fine bits of Renaissance work, the drawings of which are

finished with a perfection of realism which we never see in England, but which, when the object is the adequate representation of ancient work, cannot be considered as wasted labour. To work up a drawing for a new design, not yet executed, in this minute manner, would be a waste of time, as it would not affect the execution of the work at all, nor be of any particular assistance to the workman; but with a drawing which is an illustration and record of an ancient piece of work there cannot be too much trouble expended on rendering it a full and precise representation; and it is in this class of work that the French so much surpass us. From the style of M. Pontremoli's drawings we may look on him as one who may be likely to furnish to some future Salon a monumental set of drawings to rival those of some of his predecessors to whom reference has been made.

Failing the appearance of any great collection of drawings by one hand, we naturally turn next to see whether the recent great competition for the 1900 Exhibition buildings has set any special mark on the architectural exhibits of this year; but the subject is not very largely illustrated, and the drawings which do illustrate it have a tendency, we fear, to be amusing rather than seriously interesting. We are treated at all events to several remarkable suggestions for utilising and improving, for the occasion, the Eiffel Tower, which now must be regarded, we fear, as an accepted evil. M. Boutron shows the tower in the likeness of a huge gilded toy, with the ends of a semi-circular gilded pavilion showing symmetrically on each side of it. The Eiffel Tower does not show its scale much as it is; the decoration and treatment employed here would reduce the apparent scale still more. The whole style of work suggested would be tolerably suitable for a temporary exhibition building on a much smaller scale; on the scale suggested the effect would be barbaric, not to say barbarous. The plan shows a proposal to utilise the space between the river and the Trocadéro building as an ornamental lake, an effect hardly worth the cost it would entail. M. Pille's "projet" for the exhibition shows the Eiffel Tower under another disguise, covered with an architectural mask intended to give it a more solid and monumental effect. This is less vulgar than the other, but just as absurdly out of scale. If

the Eiffel Tower is to remain, the more simply its construction lines are displayed the better; let us see it as what it is, not as a monster in disguise. Other portions of M. Pille's design, his numerous sketches of groups of Colonial and Foreign exhibition buildings along the banks of the river, for instance, are very clever and picturesque, and his domed palaces on each side of the Champ de Mars, intended to occupy nearly the positions now taken up by the Palais des Beaux-Arts and Palais des Arts Libéraux, are treated in a fine and dignified manner. M. Courtois-Suffit exhibits some fragmentary sketches towards an exhibition building, of which the elevation of the "Palais du Meuble" has better architectural lines, and is more sober in its design than any of those previously noticed; the water-colour drawing of the proposed effect of part of the author's exhibition building, by moonlight and artificial light contrasted, is cleverly sketched, but is rather a piece of clap-trap.

The desire to be in front in the great show of 1900 has evidently been answerable for the appearance of some other designs, which their authors fondly hope to see accepted and grouped with the exhibition buildings. M. Tronchet's "Un Eden pour 1900," is a design for a vast Casino, to be erected on a site on the Champs Elysées. There is merit in the plan, but as to the design, it is the kind of thing which an architect can only propose from a desire to catch the public and make money, not from any interest in his art. M. Esnault-Pelterie's "Étude d'un Nouveau Palais aux Champs-Elysées" is of a more serious order, and appears (though not so stated in the catalogue) to be intended as a design for a building to take the place of the Palais de l'Industrie when the inevitable moment arrives for the destruction of the latter. It is a design which affords a curious illustration of that lack of perception of scale which is so common a failing among French architects at the present day, in spite of the exceedingly "classical" training they go through, which is supposed to have such value in specially developing the sense of scale and proportion. The design consists of two well-treated blocks of building of Classical ordonnance, which on plan take the form $\subset \supset$, the two blocks of building each containing a garden in their centre, and leaving between them a square space equal to the width of building and garden combined. This square space is covered over

by a gigantic iron dome of segmental section, with an enormous kind of crown or coronet on the top of it as a finish (the coronet itself is about as wide as two bays of the "order" of the buildings), and this dome is made to appear to abut against the elegant classic structures on each side of it. The contrast is something perfectly ludicrous, and one cannot help feeling that, however weak we may be in some points of architectural drawing and design in comparison with our neighbours, our architects have at least sufficient common-sense left not to perpetrate such anomalies in design as this; and certainly our Royal Academy would not hang such things if they were sent in. As regards the plan, the general idea is not a bad one, if it were only treated in a less preposterous manner.

Among other things connected with the future Exhibition are two or three designs for the building for the exhibition of the *Sèvres* manufactures, which it is intended to make a striking feature. Of these, that by M. Moisan is a glass-roofed building coated with ceramic work on a large scale, blue and yellow colours predominating, especially in the central dome. The best part of the design is in the arcades at each side, with either gold mosaic or yellow ceramic backgrounds and white statues showing up in front of them, and blue vases making points in front of the statues. The design is spoilt by the flagrant vulgarity of the turrets or minarets at each end of the façade. The design by M. Selmersheim is free from bad taste but rather commonplace. That by M. Félix Debat is, we hope, the one to be carried out, for it will not be easy to beat it. It is a fine, sober design, with no garish eccentricities, either of outline or of detail; the strongly-marked horizontal cornice keeps all the coloured details well in their place. The upper portion of the walls is pierced by plain circular-headed windows, the wall-spaces between which are decorated in panels with designs of dancing figures and ornamental detail in coloured tile-work. Beneath the string-course under this main range of windows is a frieze of figures in flat treatment, interrupted beneath each window by a niche crowned with a small pediment (the lines of which cut into the window space above), and occupied by a figure in relief. The effect of the whole design is at once decorative and architectural, and it shows real refinement of taste.

The exhibition, of course, contains a considerable proportion of those "projets," shown in very large and beautifully-shaded geometrical drawings, which are always a characteristic of the Salon architectural rooms. M. Josso's "Musée de Nantes" has very much the appearance of a "projet," but is exhibited as an actual work, either contemplated or executed. It shows the inevitable rusticated ground story; there is an Ionic order of coupled columns above, with statues between them. The plan is effective, and shows a large columned entrance-hall running across the building, with a square sculpture-hall opening out of it at each end; beyond this is a symmetrically-planned grand staircase, and beyond this again is a great square central hall, with an arcade round it, and top-lighted, intended for antique sculpture. In connexion with such an idea, the rampant character of the painted decoration is utterly out of place, and, indeed, almost revolting. M. Baubain's "Musée d'Armes et de Médailles" is a well worked-out design of purely academical type. Of a very different order is M. Hannotin's fine design for "Une Nécropole avec Monument d'Incineration"—in fact a cemetery or Campo Santo, combined with a crematorium. The main building is a great oblong court with a cloister round it, divided into groups of three arches by massive turrets which rise at regular intervals; at the upper end of the court is a kind of circular chapel consisting of a large dome springing nearly from the ground line and terminating in a smaller

dome developing out of the upper portion of the large one. The extract flues from the furnaces (as we take them to be) assume a nearly columnar form, and rise separately at three or four points. The drawings are numerous and very impressive, the geometrical drawings being coloured so as to give a great deal of picturesque—almost poetic—effect; the whole is a very remarkable and original architectural conception.

Among others of the larger and more important designs is the study by M. Terra (a pupil of M. Laloux) for a Palais de Justice for Lisbon, which is announced as "commended by the Portuguese Government." This is a fine design of a stern character, though the author of it is obviously very much indebted to the Paris Palais de Justice for the general inspiration of his design. The design shows an Ionic order in the centre block, with a Roman Doric order in the wings; the whole treated in a simple and even stern manner suitable to the proposed object of the building. The plan is symmetrically arranged and fairly good, but the public entrance to the courts is much too near the main street entrance. Another application of Classic architecture is seen in a design by M. Hélarid, "Projet de Temple Protestant." This is a building in the general form and proportions of a Roman temple, but with large arched windows at the side, and a circular end window with a cross worked into it as a form of tracery. There is something in the idea which is not unsuitable to a church for modern Christian worship. A "Projet du Théâtre" prepared by M. Schmidt for some "société des bains de mer," the name of which is not given, shows a good Classic design of rich type, the auditorium and stage portion sufficiently distinguished externally; the dome-like roof of the former is treated with coloured tiles in a manner evidently derived from M. Formigé's domes at the Champ de Mars; the carved masks on the balustrade are a good deal too large for the rest of the detail (another example of the neglect of scale). A "Salle de Concert" at Zurich is exhibited by M. Meyer. This looks much more like an ideal than a real scheme, but it has merit. A competition design for a great railway station at Bucharest, by M. Farge, is worth a note, for the bold manner in which the author has expressed, in the three great arches and gables of the front, the interior laying out and roofing of the station, and for the absence in the design of any unnecessary or clatter ornament. The design by M. Letrosne for a "Phare Electrique et Sonore," i.e., an electric lighthouse with fog signals, is creditable to the author, and the principal elevation is rather fine and impressive, though the details, powerful but coarse, are for the most part not much better than we might have expected from an engineer. Another design that is worth attention is that by M. Berger, for the decoration of a public place. This consists of elevations, on rather a small scale, and very carefully drawn, of the various buildings on each side of the supposed "place;" a classic Hôtel de Ville with a large dome, a lower block of buildings for the flanking sides, and semi-circular colonnades with an arch decorated by a quadriga, which we may presume forms the approach. There is a great deal of good architectural quality in this set of drawings. A design for a bridge, by M. Rives, has evident relation to the possible formation of new bridges over the Seine in connection with the 1900 Exhibition; this is rather a successful design for a Classic pavilion and fountain in the centre of the river, with iron bridges with covered verandahs, and a good deal of coloured decoration, connecting this on each side with stone pavilions on the banks, of similar architectural character to the central one. Another very interesting exhibit is a small and very delicately-finished water-colour drawing, by M. Mitsch, showing what he calls the "synthèse esthétique d'une ville lagunaire idéale," and consisting of a series of small coloured elevations of various buildings standing by the side of water. In

this, too, there is no doubt some intention of hinting that the author would understand how to group temporary buildings along the Seine in exhibition time; but the drawing is so small and delicate that it is nearly lost among the drawings on the average Salon scale. We ought also to mention M. Mewes' design for the rebuilding of the Opéra Comique, which is refined and reserved treatment, and shows some originality in the application of carved ornament and sculpture.

A large and important decorative drawing is exhibited by M. P. J. E. Deperthes showing an interior perspective of the "Salon des Cariatides" at the Hôtel de Ville, with the decorations painted by M. François Flameng. The Caryatides which give the name to the apartment stand on the piers of the gallery balustrade and appear to support a part of the beams of a coffered ceiling. The room shows an order of columns in the lower portion; the lunette in each bay are painted with very graceful groups of figures; in the spandrels the decorative effect is rather spoiled by the large "swags" painted over the smaller decoration; but the whole effect of the room is good. A very good bit of decorative design is exhibited by M. Labreux, a mural decoration for a room, divided into panels in which figures and foliage in low tints inclining to yellow are painted on a faint green ground in the centre and a darker ground at the margins; the effect of the whole is very refined. In the gallery occurs a drawing of a ceiling decoration by M. Gilbert, showing the upper portion of a Classic order and entablature seen as if looking up at it from below, and a blue sky and clouds above the balustrade. We thought this kind of thing was obsolete, even in France. M. Destombe exhibits the drawings for his monument to Nadaud, a model of which stands in the centre of one of the architectural rooms the centre portion, crowned by a pediment, shows the bust of Nadaud in alto-relief, with a composition of muses or other ladies singing and playing below, in lower relief; the sides are flanked by curving colonnades. The general effect is good, but the details are not remarkable, and the finials with grotesque busts at the angles are very ugly. There are two or three other monument designs scattered about, of which the most noteworthy are a tomb designed by M. Lafargue; a water-colour drawing of the Testelin monument, exhibited by M. Bonnier (the designer of the architectural portion of the monument), and a pretty and interesting sketch of a "Petit campo santo," at the cemetery of St. Germain. This is a small walled enclosure, with a pedimented block in the rear, decorated with coloured marble and emblems, the front closed with cross-barred gates and railing in the Roman style.

As usual, in the two classes of churches and private houses the exhibits are very unsatisfactory to the English eye. The church in course of erection at Vigneux, exhibited by M. Tubeuf, with its immense projecting balcony at the base of the spire is something awful and incomprehensible to the English mind. One does not know where the French get this kind of Gothic detail from, of which there are other examples as flagrant. In "Eglise pour un village de Lorraine" M. Berger shows us a kind of Classical church with semicircular clear-story windows with radiating tracery bars, which remind one more of a railway station than of anything else; and this for a village church. In the matter of houses, the French of "Hotel," or "maison à loyer," is a good type of town architecture, and there are several typical examples of it here, shown in large and fine drawings. The drawback to this class of French street architecture is the exceeding sameness of the type; after you have seen one or two you have practical seen all, for they vary in no important degree everywhere there are the same balconies, railings, the same corbels, the same bits of sculpture over the doors. Still, it is a good type of house architecture of the

class. It is when the French architect holds of a country house that he shows at his worst. The unostentatious picturesque seems unknown to him. A country-house is marked by gewgaw wood-work and immense spiky finials at the eaves. The climax is reached by M. Perroux in his "Projet d'Habitation Suburbaine," for which he ought to have stones thrown at him; it is a kind of thing that sets one gasping for breath to utter one's feelings. Among a few redeeming things in domestic architecture may be mentioned the villa in the Italian style, designed by M. Vallette for the Comte de B—; and the "Hôtel de M. Geraud" at Passy, by M. Pergod. This is a simply-designed brick house, with a corbel cornice at the eaves; it is noticeable that on comparing a photograph of the house with the perspective drawing, we see that the stone corbels as actually carried out have been amplified from the original design, with manifest improvement.


The Exhibition contains a good many drawings of old work, concerning which we may say that the frames of small sketches—travelling sketches—are in general not so good as those which our English sketching architect would bring home; but on the other hand the large and highly-finished drawings of old work which are to be seen here and there on the walls (in addition to some we have already mentioned) are superior to anything of the kind we are accustomed to see in England. We may mention especially to the geometrical coloured drawings of the curious Calvaire and cemetery chapel at St. Thégonnec (Finistère), a naive piece of Early Renaissance work, the drawings of the Church of St. Maria dei Miracoli by M. Totten (an American birth), and the splendid coloured drawing of the portal of the Church of the Convent of St. Leonardo, at Pouille, in Italy. This is a remarkable monument, in which common forms of what we call Norman ornament (hatchings and lozenges) are mixed with beautifully-carved capitals in almost pure Byzantine style; the whole shown in a very large water-colour with almost the verisimilitude of reality.

Among the chateau-restoration drawings, which are not quite so numerous as usual, M. Girette's restoration and enlargement of the Pavillon Sevigné at Vichy, is really interesting, and illustrated in a very good set of drawings. But the most interesting of drawings of this class are the sketches of partial restorations by M. Girault of the chateau of the Ile d'Yeu, off the coast of La Vendée. M. Girault has added a manuscript memoir as to this remarkable relic of a great Medieval stronghold erected on a rocky island, of the probable former site of which he has endeavoured to give some indication in his sketches.

The architectural exhibits at the New Orleans, as already hinted, need not detain us long. There is a very good exhibit by Benouville in the shape of a full-size model and sections of a billiard-room recessed ceiling; in the recess there is some pretty decorative stained glass of rather unusual type. M. J. A. Besnard exhibits a fine set of drawings of the abbey church of Boscherville. Some of the other things that force themselves on one's notice are rather absurdities. M. Guillemont shows a design for the 1900 Exhibition with the upper three-fourths of the Eiffel Tower cut off and the lower portion made the footstool of a gigantic gilded globe of the earth. M. Garas provides for a "maison de retraite" in the mountains for an artist, musician, and painter—after he has had his reason, we presume, for it is one of the maddest things we have ever seen. M. Roy's drawings and restoration of the chapel of the Château de Bouilliet are interesting; this is a small chapel with the peculiarity of a central aisle dividing it into two aisles. M. Vincent shows some drawings of a curious little church in Corsica (St. Christina, near Cer-

vione) with a double apse at the east end. M. Plumet shows drawings with a model of the front of a Paris mansion (there seems to be much more favour shown to models at the new Salon than at the old); and M. Baudot gives drawings of part of the Lycée Victor Hugo at Paris, which are good in a practical sense, but look (like Paris Lycées generally) more like a railway station than a school. French modern school building is absolutely devoid of the domestic element in its architectural treatment. There is a certain amount of decorative work: a large stained-glass window representing a boar hunt, carried out by M. Gaudin, from the designs of M. Grasset, with a very brilliant and sparkling effect, but utterly undecorative in its lines; a pretty piece of bath-room decoration, shown on the walls of a built-up room, by M. G. Morren; and various designs for wall-papers and textiles, by M. Aubert, which are not in bad taste, but which to an English mind are extraordinary in their weakness and want of all breadth or power of design. They would not even take a medal at the "national" competitions at South Kensington. French designers should make some acquaintance with the best paper and textile designs of Mr. Morris, Mr. Crane, and other English designers: they would perhaps then realise how absurdly they are in the rear in this department of artistic work.

NOTES.

 THE Exhibition of the Art of Ancient Egypt at the Burlington Fine Arts Club is on the whole more interesting in an archaeological than an artistic sense. The pottery exhibited is of a very simple kind, and does not present any special attractions in design. The catalogue or the numbering, in respect of this portion of the collection, seems to have been rather carelessly done, as some at least of the numbered articles of this class do not correspond at all to the descriptions in the catalogue. In Case D we may admire the fine conventional treatment of the small hawk carvings in chrysolite, and the remarkable spoon (37) with a broad open-work handle in which is carved the figure of a dancer. This is a fine object and worth the study of designers. In Case I is an interesting and nearly complete example of the peculiarly uncomfortable Egyptian pillow, an alabaster open ring or hoop for receiving the head, mounted on a vertical stand or pillar. In Case O (No. 14) is a rather remarkable necklace of blue faience, the main design consisting of very naturalistic flowers strung together along with beads. Some of the glass is interesting, though it does not present any forms that are not familiar. The most interesting portion of the exhibits by far, from the artistic point of view, are the gold ornaments and jewellery in Case S. The greater portion of this is of late date, but there are some more ancient examples, and some of these are very quaint and interesting. One point which some of the gold necklaces illustrates is the effective manner in which plain chain-links may be fashioned and intertwined; notice especially No. 7 in Tray A, and Nos. 77 and 89 in Tray E. Some of the forms taken by the details of necklaces are exceedingly interesting and suggestive for designers. No. 98 (Tray F) is one of these; a necklace of gold and amethyst beads, four drops in the shape of shells, three drops of cornelian and lapis lazuli. The chain portion of the necklace is formed by little squares of gilt metal or gold, like miniature gridirons, which have a very characteristic appearance. Both in Egyptian and Greek work of this class one may notice what a good effect is obtained from stringing together in a perfectly loose and flexible manner forms which in themselves are square and formal. A good many other articles in this case are excellent and unusual in design, and are worth the study of those who can obtain entrance to the exhibition, which is readily granted to any

who are interested in the subject. The collection contains, within the small compass of the well-known room at the club, an immense number of objects of various kinds, but as we have said, the majority have not any special artistic value.

LORD ROSEBERY'S speech at the Royal Academy banquet was certainly not in the spirit of a Minister of the Crown: it was much more that of the critic than of the administrator. He spoke, he said, as "an irresponsible dreamer of dreams," and these dreams were of the day when the State would commission eminent artists to paint portraits of eminent living men. "You will never," said the Prime Minister, "have a satisfactory portrait-gallery unless you are able to give commissions to living painters to paint living men." To commemorate history in this way is admirable—in a dream—but it must be confessed that the idea of a Government department giving orders to artists to paint important personages is not one which can ever be realized. We much doubt, indeed, whether the result would be satisfactory. The Treasury would scarcely allow fees which would compensate the leading artists of the day, and a new Department would have to be organised to consider the claims of those who might consider themselves entitled to a place in this Valhalla. The building is not planned which would hold the portraits which a Department, urged on by ardent politicians, would purchase from second-rate artists. After all, time sifts the wheat from the chaff in public life, and with due deference to the Prime Minister, the country has a truer national portrait gallery, by obtaining portraits of men who in due time have become recognised as historical characters, than it would have if a Government official ordered the portrait of every man of the day who, in his opinion, was likely to become historical.

AN exhibition, passing under the name of the "International Health Exhibition," is now open in Manchester, and, if we may judge by the crush there when we visited it, is at least popular. We noticed, too, that besides the usual crowd of gay sightseers, there were many "horny-handed sons of toil" who examined the specimens of plumbing, &c., with evident interest, and with an eye to their own improvement. The exhibition may, therefore, prove to be not only a commercial success (which is, we imagine, its primary object), but also (and this is of higher moment) an object-lesson in sanitary science. A committee, consisting of representatives of the "Manchester and Salford Sanitary Association" and the "Manchester Council for the Registration of Plumbers," has had almost sole control over the selection of exhibits; and while there are, of course, several stands which have no special right to appear at a "health" exhibition, yet, on the whole, the committee must be congratulated on having obtained a display covering a considerable part of the wide field of sanitary science, and forming a valuable museum of reference in elucidation and continuation of the three-days' conference on "Sanitary Progress and Reform" recently held in the Manchester Town-hall. The exhibits (neglecting those which have no special connexion with health), range from drain-pipes to disinfecting fluids; from baths, lavatories, and water-closets, to tanks for sewage treatment, and from cooking-stoves to cremation. The Manchester Corporation exhibits drawings of the Holt Town Sanitary Works, and models of the Manchester receptacle closet, with side cinder-sifter, &c.; particulars are given of the manufacture, from the contents of the pail-closets and other refuse, of grease, soap, disinfecting powder, manure, &c. A somewhat similar exhibit is that of the Health Committee of the Rochdale Corporation, illustrating the Rochdale system of refuse and sewage treatment. One of the most interesting stands is

that fitted up by the Sanitary Engineering Department of the Manchester Municipal Technical School; here may be seen models and appliances of various kinds, including sections of water-closets and traps, different sorts of ventilators, and a working model of the hot-water system of a house; the last includes a copper boiler (heated by a Bunsen burner), a cylinder, cistern, and glass pipes with brass connexions, but no safety-valve; examples of defective plumbers' work are also shown. An extremely useful exhibit is that shown by the Manchester Council for the Registration of Plumbers; it consists of "a house" with all the necessary water-fittings and sanitary appliances fitted complete, all full-size; everything is provided, kitchen-range and boiler (the latter fitted with an ordinary dead-weight safety-valve), cylinder, cistern, hot-water coil or towel-rail, bath, lavatory, water-closet, sinks, &c.; all pipes are in sight, and are of lead fixed with ornamental clips; the traps are ventilated; and, as water is turned on, the fittings can be tried at will; altogether an excellent and instructive example of plumbers' work. Space forbids us to do more than mention other exhibits. Some of them, such as those of the Albion Clay Co., J. Duckett & Son, and Shanks & Co., were noticed in these columns in connexion with the recent Building Trades Exhibition in London. Shanks & Co.'s "Tubal" or "Instantan" school lavatories may be mentioned as an interesting novelty, and their "Syphonic" closet fitted with Lightfoot's "Unity" cistern works well, and is certainly proof against syphoning, having $8\frac{1}{2}$ in. depth of seal. Attention may also be drawn to the interesting displays of the "Loco" Draining Apparatus Company, Limited, W. Ingham & Sons (fire-clay goods), Mooney and Co. (baths, &c.), and the Sanitation Improvement Co. (Stafford closet, with tipper).

ON Thursday in last week Professor Unwin delivered a lecture before the members of the Institution of Civil Engineers on the "Development of the Experimental Study of Heat Engines." The lecture formed one of the series instituted at the desire of Mr. James Forrest, and illustrated how largely the work of the practical engineer depends on the researches of his more theoretical brethren. The first serious attempts at improvement in the steam-engine were made by Watt in the beginning of this century, and later by Trevithick and Grose, and the time which has since elapsed has been wholly occupied in applying their principles, no new theories having been advanced in the interval. The impetus given by Watt by standardising the duty of his engines, caused Joel Leach and other engineers to persevere until the duty was increased from 7 millions to 107 million foot pounds. We are indebted to Josiah Parkes, however, for the first scientific trials of a boiler apart from the engine, but it was not until the Mulhouse trial in 1859 that the importance of the air supply and chimney waste was recognised. Although expansive working was patented by Watt, he made no use of it, and it is to the discoveries of Regnault, connected with the physical properties of steam, that we are indebted for the first reliable information on this portion of the subject. Joule's discovery of the equivalence of work and heat caused the study of thermodynamics to receive much attention, and in a few years Rankine, Clausius, and Zeuner had built up rational theories. Great discrepancies appeared, however, between their calculations and experimental results, since they overlooked the evil attending all steam-engines, namely, cylinder condensation. Hirn's experiments demonstrated the great influence of steam-jackets, but, as Professor Unwin pointed out, the jacket becomes of less use as engines are better designed; it lessens the evil but does not remedy it, and it is to superheating which we must turn if we require still greater economy in the steam-engine.

THE current number of the *Geological Magazine* contains an interesting article by the Rev. E. Hill, on the destruction of the church tower of Eccles-by-the-Sea, by marine denudation. That part of the Norfolk coast is protected to some extent from the ravages of the sea by a long line of sand-dunes—low hills formed by the action of the wind. These "travel" inland, the sea-breezes blowing the loose sand before them, but the rate of progression is very slow. In the course of their movement the sand-dunes bury anything which comes in the way, and Sir Charles Lyell states that by the year 1839 the church above-mentioned became involved; his illustration shows the tower emerging from the centre of the line of sand-hills. Returning to the spot in 1862 he ascertained that the tower was nearly free of them on their seaward face, at a distance from their centre about equal to its own height. In other words, he found that the sand-dunes had travelled inland about 40 ft. in twenty-three years. Mr. Hill, on going to the place in 1893, noticed that the line of hills was entirely separated from the tower, and from measurements taken he found that the dunes had advanced about 90 ft. in fifty-four years. The strip of land between the church and the sea, being deprived of its line of defence, however, rapidly succumbed to the action of the waves. In 1893 the foot of the tower was about thirty yards from neap-tide high-water-mark, and its level scarcely 4 ft. above; Mr. Hill remarks that spring-tides must have nearly or quite reached it. In November, 1893, a gale bared the foundations of the church, and the opportunity was taken to make plans of the same. On January 23rd of the present year another storm arose, which brought down the tower, and practically destroyed the whole edifice. When this church was built, there must have been quite a broad stretch of land between it and the sea; but the rate of denudation along that and many other parts of the East Anglian coast is so rapid that in course of centuries, whole towns have disappeared. It is not the first time that Eccles has suffered from these encroachments, for in 1605 hundreds of acres of land, with sixty-six houses and their inhabitants, were swept away in one night.

A REPORT has recently been made by Mr. Evan Evans to the Local Government Board upon the General Sanitary Condition of the Festiniog Urban District in the north-western portion of Merionethshire. The physical characters of the district present points of considerable interest, and give rise to conditions of peculiar difficulty in connexion with drainage and dwellings. The district is for the most part mountainous, rocky, bare, and intersected by deep valleys. The whole area lies on the Cambrian formation, and occupies the south-westerly slope of the denuded edge of the great Merionethshire anticline. A series of terraces have been formed by the unequal weathering of strata of different degrees of hardness, and since the strata have a considerable dip to the north-east, it follows that behind their edges depressions have been formed in which water accumulates, and drainage works are necessary to prevent the constant saturation of the subsoil with water. An excessive rainfall is one of the chief characteristics of the district. A fall of 99 in. of rain has been the average for the last ten years in the immediate neighbourhood of Blaenau. Such a large amount of rain falling on precipitous slopes is a continual source of nuisance through the production of dampness in dwellings. The streets are everywhere in a neglected condition. There is hardly anywhere any proper channelling, and the footpaths are almost invariably unpaved. The available yard space for the houses is often very limited, because houses have been built on narrow terraces on the rocky and precipitous mountain sides. Many of the older houses have been built

against the bank. The dwellings that have been erected during the last twenty years are mostly stone-built five-roomed houses, well constructed and ventilated, and are generally provided with a fair amount of garden space. Unfortunately, no provision has been made to protect their foundations against damp. This damp condition of dwellings is the more easily brought about in consequence of the almost universal practice of utilising large stone flags from the neighbouring quarries for purposes of flooring. Moreover, even in regard to some of these newest dwellings, leaky culverts for the conveyance of slop-water and rain-water from roofs and yards were observed to have been placed close to the foundations of the walls. Several of the streets, too, have been built on an imperfectly-drained bog. The parts of the district provided with sewers, water-closets are in general use, and as regards the majority the Author has recently enforced the use of flushing cisterns. For the remainder of the district the old-fashioned privies have to a large extent been replaced by pails, which are removed at weekly intervals in a proper covered van by a contractor under the Sanitary Authority, and deposited on an open space at a safe distance from dwellings. Cefn Twsgl, where the contents of the pails are mixed with house refuse and gas-lime. But the houses on the banks of the Barlwydd have a large number of privies which are erected over and discharge into the stream. Other privies are built over small rills, which at ordinary times an insufficient volume of water passing through them to effectually remove the excreta. In summer these rills are often dry, and the "water privies" at such time become a serious nuisance, which a still greater nuisance is produced by the after heavy showers of rain, when the excrement accumulated beneath them is swept into the immediate vicinity of dwellings. General results: presence of phthisis, pulmonary fever, and diphtheria, attributed to the Report mainly to conditions of lodgment, cold and damp dwellings, and sleeping rooms deficient in lighting and through ventilation.

IN the course of this month will be offered for sale the engineering works and mint, with all plant and machinery, of Messrs. James Watt & Co., being the well known Soho Foundry, Smethwick, near Birmingham. The Soho Works were founded in 1757, Matthew Boulton removed thither from Snow-hill, Birmingham, in 1762; he re-built Edw. Ruston's mill and house, and speedily made a reputation for his improvements in industrial arts; within ten years he employed nearly one thousand hands; and the brothers Adam built for him a show room in London. In 1775 he was joined by Watt, for whom he had taken a house, Regent's-place, Harper's Hill. New forging shops were erected at Soho for the making of steam-engines. In 1781 the firm began their subsequent extensive mintage operations by coining 100 tons of copper for the East India Company. 10 more presses were added in 1788, the eight being equal to coining 1,200 tons of copper per annum. In 1797-1806 they coined 4,200 tons of copper for our country, besides supplying France (in 1790-92), the American colonies, Sierra Leone, &c. They also made minting machinery for various foreign nations, and for the Mint on Tower-hill, where one of their presses was in use two hundred years ago. In 1800, their two sons having already entered the firm, Boulton and Watt dissolved partnership. Boulton died in 1809; Watt, who retired to Heathfield (where his garret workshop has been preserved as he left it), survived him, and died on August 19, 1819. Both are buried in Handsworth Church, where is a monument to Watt by Chantry, sculptured too, of the incongruous statue in St. Paul's.

apel, Westminster Abbey, bearing an inscription by Lord Brougham. Soho works were first lighted by gas in 1802. Murdoch, who was in their employ,* vestige remains, we believe, of the old Mint, which was dismantled in 1850, and its machinery was sold. The present is constructed a fresh mint in 1863 for melting the new British bronze coinage. Murdoch when in their service invented the circulating engine, and the sliding eduction valve, modified as the long-D slide valve to a portable engine. He also has been credited with the eccentric. When Boswell visited Milton he had more than seven hundred men, all engaged, as he said, for the selling of what all men want—power.

It is well that the older works at the exhibition of "Fair Children" at the Art Gallery are grouped near the entrance, for few would give them very much attention after looking at the modern works. The ancient portion, it must be confessed, is not very representative. But among the paintings of the present and recent times are a number of beautiful pictures of children, some of them well known, and which we are glad to see again, and which are equally good and less worn. Among them, Mason's "Girls coming by the Sea" comes as a dear old picture (and unfortunately hung in a very bad position). Sir J. Millais' world-famous boy with wing bubbles is there, and Mr. Hacker's splendid portrait of "Master Hoare," seen so long since at the New Gallery. Sir J. Millais' "Orphans," with that wonderfully-endowed rabbit, and other fine child-pictures by Sir F. Leighton, M. Carolus Duran, and others. Watts. One of the best things there is J. Poynter's "Edward, fifth Earl of Darnley," a beautiful little boy in a dark blue dress and red cuffs. Among the objects that could not be overlooked is Webster's remarkable picture, "The Playground," old-fashioned in style, but displaying an amount of variety of expression and character among a crowd of figures, which is very remarkable.

THE state of matters in regard to the Works Department of the London County Council is obviously unsatisfactory, and it is doubtful if the debate in the Council on Tuesday last will tend to give ratepayers of the Metropolis confidence in this particular department. That there has been an undoubted increase in the cost of various pieces of work is clear; and it is also clear that there is a divergence of opinion among the responsible persons on the subject. The Manager of the Works Department tags the blame on the too great inexperience of the architect, but after the vote of the Council on Tuesday approving of the conduct of the architect, it is obvious that he must be regarded as having acted strictly and properly in the execution of his duty. The chairman and vice-chairman of the Works Committee seem to be equally at variance in their views. We should be sorry to omit an exhaustive examination of all the details of the various pieces of work which have been undertaken to say how the excess of cost over estimate arises. But there can be no doubt that the Works Department did not commence its labours in a business-like manner. It was set up in an amateurish and not in a business spirit. The majority in the Council appear to have been under the impression that they had only to set up the Works Department, and to authorise it to undertake every kind of work, to have the cost of contracts lowered, and the workmen of the Council pleased by abundant wages. The proper way to inaugurate a Works Department was to authorise it to get under

It is amusing to read that when the House of Commons was to be thus lighted, the pipes were fixed at such a height from the wall, it being popularly believed that the gas was carried through the pipes in a state of incandescence.

way by degrees—to undertake smaller kinds of work in the first instance, and to proceed tentatively, and in an experimental spirit. We are much inclined to think that the limits within which a Municipal Corporation can satisfactorily be its own contractor are narrow. At present the County Council appears to be discovering these limits, but not without considerable cost to the ratepayers of London.

THE result of a small competition which has just been decided, for cottage homes and schools at Styal, Cheshire, raises a question, to which our attention has been drawn by more than one correspondent, as to the proper and logical procedure to be adopted by an assessor in respect to designs which, with whatever general merits, do not comply with the conditions. The assessor in this case was Mr. Macvicar Anderson, whose fairness and impartiality in such an office are of course beyond question; but we do not understand his logic. He recommends for the first premium the design signed "Snowflake," as to which he says in his report (a copy of which has been forwarded to us) that he has no hesitation in placing it first, but adds, "it is extremely unfortunate that the author provides accommodation for 286 children only," instead of the 300 which the conditions of the competition demanded. Surely this was a reason for disqualifying the design altogether. The first business of a competitor is to take note of and to comply with the conditions and requirements of the programme; the first business of an assessor is to put aside and disqualify the designs which do not comply with the conditions. No other course is fair to the other competitors. What are the conditions for? To recommend a design which does not conform to them, however meritorious it may be in other respects, is surely a very illogical procedure.

THE ROYAL ACADEMY EXHIBITION.

A MORE careful examination of this year's paintings leads to the conclusion that this is a more interesting exhibition, from an artistic point of view, than we had realised at first glance, though there is no very great work to be found in it, and though some eminent painters are hardly at their best. Among these is Mr. Watts, whose "Jonah" (147) is a very unattractive picture both in design and colour, though this conception of the prophet, as a kind of raving fanatic, has an intellectual interest as in accordance with historical probabilities. The figure at once suggests a parallel with Solomon Eagle, the prophet of the London Plague; an association which we observe also occurred to the critic of the *Times*, who had the opportunity (*perant qui ante nos nostra dixerunt*) of getting it into print first. This is one of the cases which suggests the consideration whether it is worth while to paint an ugly picture for the sake of historic truth, as to which, in the Vicar of Wakefield's formula, "much may be said on both sides." Mr. Watts's "The Outcast," namely "Goodwill" (258), a rosy naked little child by the roadside, is also rather more interesting from the moral than the artistic side; it is not one of the painter's best children.

Every one will be glad to find our greatest portrait-painter (may we not say our greatest painter) reminding us that he is much more than a portrait-painter; we only wish he would remind us oftener. "Speak! Speak!" (251) the ejaculation of a bereaved husband to the vision of his late wife which appears at the foot of the bed, forms the title to a picture characterised both by dramatic energy and powerfully contrasted effect of light and colour. It has been objected that the ghost returns to earth very well furnished with diamonds, but that is hardly a scientific criticism; the apparition is the reflex image conjured up in the man's brain by an imagination excited by the study of her letters (that seems to be the story), and it is perfectly in accordance with probability that the image should take the form of apparel in which, perhaps, her beauty had made the strongest impression on his memory; what the painter is depicting is no idea of a personal visitation of the dead, it is the reflex image of the man's brain made visible to the spectators. There is, therefore, nothing illogical in the diamonds, which add immensely

to the pictorial effect of a work which, both in regard to artistic power and sentiment, grows upon us as it is studied. Of Sir John Millais' other exhibits, "A Disciple" (166) is singularly beautiful in its fervid expression. "St. Stephen" (18) is hardly such a success as the others; it is a rather prosaic conception of the dead saint; it is not an "effective" picture, though it must be admitted to be a pathetic one. Sir John also exhibits a very solid and finely treated portrait of a lady (331).

The President's central work, "Flaming June" (195), represents a large sumptuous woman in bright red drapery, asleep in a somewhat contorted and doubled-up attitude, on a stone bench; there is a great style about it, the drawing is fine, the combination of colours in the accessory draperies is a feast to the eye; the jarring note is in the brassy-looking sea in sunshine beyond. The less landscape there is in Sir F. Leighton's paintings the better for them. The smaller painting, "Lachrymæ" (182), a woman leaning in the dusk over a funeral monument, is a more perfect though much less striking work than the last-named. The half-length of a young girl, "The Maid with the Golden Hair" (139), is marred by the blank, colourless character of the face.

Mr. Poynter and Mr. Alma-Tadema each send one work, the two being, as usual, hung near each other, and forming a kind of rivalry in the revival of classic architecture and decoration and classic figures. Mr. Alma-Tadema's "Spring" (262), a larger work than usual with him, is one of his most brilliant representations of Roman architecture, and is marvellous in the elaboration of some other details—notice the silver flute played by the figure in the foreground, its details would almost bear a magnifying glass; the crowd of figures and flowers has a most brilliant effect. Mr. Poynter's marbles and architectural details in "The Ionian Dance" (270), though most learnedly drawn and coloured, look somewhat cold and wanting in solidity by the side of Mr. Alma-Tadema's splendid marbles; the trees seen through the windows, too, are rather flat in appearance; but the figure of the dancer in the centre is one of the most graceful and delicate things we have ever seen in modern painting, and is, perhaps, in the matter of beauty, the object best worth looking at in the whole exhibition. Such a figure as that outweighs in value any amount of marble painting; it is really alive with graceful movement.

Mr. Briton Riviere has made a great success with his painting of "Phœbus Apollo" (160) mounting a crocus-covered rise of ground in a chariot drawn by lions (we always considered that horses were the recognised draught cattle of Apollo). The picture is full of energy and vigour, in the attitude of the god and the action of the lions, one of which turns its head and roars in answer to his exhortations; the car is a curious and interesting study. The weakness of the work is in the clash between realism and poetry—the man, and the animals, and the mechanically designed chariot, are so very material that we half look for the sawdust on the floor and a ring of spectators in the background. However, as a piece of forcible and vigorous design, the picture is well worth looking at, by whatever name we call it. Does not Mr. Calderon's "Ariadne" (210) also fall short as a poetic conception? A charming woman in some trouble, wading into a blue sun-lit sea, it is pretty and touching, but hardly poetic or tragic. In connexion with such a subject, one cannot accept mere beauty of colour or handling; we want an adequate ideal of the great Greek romance of love and desertion, and we hardly get it here. On the other hand, Mr. Swan's little picture, "The Goat Herd" (208), is one in which colour and treatment are everything. There is no "story" here, only a figure of a youth seated by some battered remains of Doric columns, with his goats, slightly indicated, in the foreground. The picture is a little vision of colour and composition which is complete in itself. "Tigers at Dawn" (314) is Mr. Swan's other contribution, also excellent in its way. In the Sculpture Room (of which more on another occasion) is to be found a little translation into bronze of his painted figure of "Orpheus," on the inadequacy of which as a conception we have before commented.

Miss Rae's "Apollo and Daphne" (621) is another classical subject disappointing and prosaic in conception, nor is it equal in execution to some previous works by the same artist. Mr. Hacker treats the subject of "Daphne" (315) as a nude study somewhat similar in style to another recent work of his; a very good study, but one is irresistibly led to think of Mr.

Watts's "Daphne," and to feel this as a very weak reading by comparison. Mr. Jas. Clark's "Parable of the Ten Virgins" (502), though not a remarkable picture, has a great deal to recommend it, both in colour and composition. Mr. Solomon has produced one of the best ideal pictures of the year in his "Echo and Narcissus" (770), half-nude figures grouped at the edge of the pool into which Narcissus is gazing, while the nymph gazes up at him, apparently in a half-swoon; her face and expression are very beautiful, and both figures are very carefully studied; we should call this the best work Mr. Solomon has produced. If we turn our back on this picture we see, in the distance at the end of the vista, in the corresponding position on the wall of Gallery II., a picture of Gothic ideal, Mr. Waterhouse's "St. Cecilia" (97).

As an illustration of the passage quoted from Tennyson's "Palace of Art" this is unsatisfactory; the effect of serene and bright atmosphere implied in the poet's beautiful expression, "a clear-walled city," is not there, and this faded woman with lank hair is a weak conception of St. Cecilia. "An angel looked at her" is translated into two angels, also with lank reddish hair, playing on old-fashioned violins. It is a composition permeated by Mediaeval fancy, and as such a beautiful one in regard to colour and feeling; but it is as far from the picture of Tennyson's conception as anything well could be, and by unnecessarily quoting the poem the painter has forced the contrast upon us, not to the benefit of his work. Painters should either let great poets alone, or endeavour in earnest to interpret their conceptions. Apart from this the work is a fine and interesting one, though, as observed, we think it is a weak conception of St. Cecilia. Mr. Richmond's painting, "Aphrodite between Eros and Himeros" (560), is very agreeable in a decorative sense, but is not nearly so interesting and effective a picture as the "Persephone" in the New Gallery, which we accidentally omitted to notice in our article of last week.

Among the pictures drawn from subjects of real life (other than those already mentioned) Mr. Stanhope Forbes takes the lead with his large and exceedingly effective picture "The Smithy" (372). The painting of the horse, seen under the strong but partial light of the forge, the interior effect generally, and the manner in which the subdued effect of exterior daylight through the half-opaque window-glass is conveyed, are all admirable, and in pictorial quality this is perhaps the best work that Mr. Forbes has produced. Yet it must be admitted that in regard to the study and realisation of human character, which is a higher and more difficult task than the production of pictorial effect, Mr. Forbes has never yet equalled the first picture which really made his fame—"The Health of the Bride." However, this work of the present year is a really striking one in its way. Mr. La Thangue's large painting "The Last Furrow" (98) is more on the scale of the Salon than the Royal Academy, and is certainly not properly to be seen in Gallery II., and we can only say that judging of it as hung it does not appear interesting, but it might vindicate itself better in a larger space; it probably suffers in effect too from its large spaces of necessarily rather dull colour being opposed to the rich colouring of Mr. Waterhouse's work which hangs beneath it. Mr. Frank Dicksee's "A Reverie" (46), which introduces us to another apparition of a deceased wife (or is it a former love? the man seems hardly old enough to be the father of the lady at the piano), is a kind of picture the public delight in, and we do not deny the ability displayed in it, but the sentiment is of a very commonplace order; and in "Paolo and Francesca" (171) the same painter has succeeded in completely vulgarising Dante's lovers; another instance of the way in which great poets are made the prey of painters who do not understand them. Mr. Clausen's "Harvest" (91) has power both of colour and action, his "Farmer's Boy" (121), also very clever, is rather too palpable an imitation of the manner of Millet. "A Sailor's Sweetheart" (183), like "A Reverie," is a kind of picture dear to the British public and to their illustrated journals, and no doubt Mr. Marcus Stone provides very adequately for this class of amateurs. Mr. Herkimer's very large painting, "The Bürgermeister of Landsberg and His Town Council" (436), which, as already observed, adds another room to the Burlington House suite, is a capital specimen of the *genus* "Presentation Picture," and is in fact quite above the ordinary level of such works; the style of handling is broad and massive, but nothing is neglected—the furniture, the design

of the ceiling, the light through the blind drawn over the centre window, are all as carefully treated as the heads of the rather rough-looking but practical town councillors, who seem to harmonise so well with the rather naive street architecture seen through the window. The artist has succeeded in making the picture interesting to others than those in whose honour it has been painted, which certainly is not always the case with presentation portraits or groups. Mr. John Collier's "Death of Albino" (589), a heroine of Zola's, is a picture of a dead girl lying on a couch amid a mass of flowers, the face very beautiful and very finely painted; the whole work shows a degree of tenderness of feeling which is not generally characteristic of this artist's work. Mr. Bacon's "Suscipe me, Domine" (556) is a more important subject than the two pictures with which he attracted so much attention a year or two ago, but it hardly bears out the promise which they gave.

Among smaller figure-pictures is Mr. Arthur Hughes's "Dreamland" (760), a child asleep in the woods, in that beautiful half-ideal light and colour in which this artist bathes his scenes; but this is hardly Mr. Hughes at his best. Mr. Dendy Sadler, in a very different vein, is quite at his best in "An Offer of Marriage" (776), an admirable study of character. Other pictures to be looked at are Mr. F. D. Millet's "An Overture" (134), a delightful bit of humour combined with capital painting; M. Bouguereau's "Baigneuse" (243), an excellent piece of academical figure-painting; Mr. Yeames's "Defendant and Counsel" (309); Mr. F. Bramley's "Sleep" (471), as a curious experiment in colour; Mr. Walter Langley's "Motherless" (798); Mr. Tuke's "The Swimmers' Pool" (812); Mr. Melton Fisher's "Vanity Fair" (844), the interior of a silk-merchant's shop, an interesting study in colour and composition in this artist's peculiar way. Mr. Albert Goodwin's "Christian leaving the City of Destruction" (337), is a repetition of that same kind of mystic aerial architecture on a great scale, which he showed us last year in "Christmas Eve"; it is not quite a success, and the "City of Destruction" reminds one rather too much of the Crystal Palace; there is a fine effect in the indication of the light of the heavenly city on the lofty peaks above.

The exhibition contains, as usual, several military pictures, of which three are important and successful works. Mr. Crofts's "Napoleon's last grand attack at Waterloo" (499) has all its usual merits in the treatment and grouping of bodies of troops, but the point of interest in the painting is (as it should be) the admirable study of Napoleon's countenance, on which, with all its expression of determination, the shadow of disaster has already settled. Mr. Gow's "On the Sands at Boulogne, 1805" (242), Napoleon cantering at the head of a small party of his general officers along the water's edge, and looking towards the country he was plotting at the moment to invade, is one of the best and most spirited pictures Mr. Gow has ever painted. Lady Butler takes us again to Waterloo—"The Reveille in the bivouac of the Scots Greys on the morning of the battle" (853). This is a hard picture and not remarkable for effect or colour in an artistic sense, but there is a reality about it which atones for much. The contrast is striking, and evidently intentional, between the wearied and not very cheerful demeanour of the awakening troopers and the alert look of the officer in the centre of the scene, who starts up on his knees with the joy of battle on his face; this figure is quite heroic, and is alone worth looking at the picture for. One uncomfortable element of realism is absent; by all accounts, the ground on the morning of the battle was in a far worse state of "slush" than there is any indication of in the picture.

In portraits the exhibition is strong, in quality if not in quantity. One may distinguish two or three types. There is the highly-finished "Society" portrait, as illustrated by Mr. Fildes's "Mrs. Arthur James" (250), which undoubtedly is a brilliant performance of its kind, and we presume this polished-up realism in portraiture is what best satisfies many persons, but it savours more of science and labour than of art in the true sense. There is more artistic life, perhaps more real "science," in Mr. Sargent's broad and massed painting in the portrait of "Mrs. Ernest Hills" (31), in which textures are conveyed or indicated rather than minutely imitated. The face in this painting is admirably expressive. It may, on the other hand, be questioned whether the broad and free use of the brush affected by some of the ablest portrait painters of the day does not sometimes lead to imperfection in the

modelling of arms and hands, as in Mr. Shannon's otherwise admirable portrait of Miss Pembroke (324), where the lights are laid on arm and hand in a manner that leaves rather an angular effect. Mr. Richmond seems to be trying a new manner in his portrait of the "Countess Pembroke" (34); some of his portraits used to be open to the charge of being hard, though decorative; in the present work there seems to be a deliberate change of manner in the endeavour after a soft texture, and absence of strong definition of line, possibly carried a little too far; but the work is an interesting one, and the figure well dignified in pose. Mr. Seymour Lucas's "Mr. J. Walter," in black dress, relieved against crimson-backed chair, is an excellent picture, much superior to his "historical" picture (77) of the next room; as also we may say of Mr. Clausen's portrait of Mrs. Herbert Roberts (5), which is one of the most original and artistic portraits of the year, and is superior in value to any of the painter's other works before mentioned. In Gallery III., Mr. Sargent and Mr. Herkimer give us two very straightforward and characteristic portraits of a well-known poet and a well-known politician respectively (172, 188), who may be distinguished as "the angel in the house" and "the god in the car"; Mr. Oulsh exhibits a capital and forcible portrait of Mr. Ernest Hunt (215), and Mr. Collier an excellent likeness of Lady Hallé (493).

English landscape-painting seems to tend more and more towards the search after delicacy and tenderness of effect rather than power. One of the first landscapes we noticed, that of Mr. Waterlow (47), the first room, shows a degree of delicacy of aerial effect in the treatment of distance which we do not remember to have noticed in his landscapes before. We see the same tendency in his "Golden Autumn" (16), the same again in Mr. East's two landscapes (1 and 575), the latter a very beautiful work. H. W. B. Davis has always been more or more among the seekers after tenderness of sentiment and delicate gradation in effect in landscapes, and in this respect his art seems to grow more perfect year by year. It is a joy to see such painting as "Forenoon on the Condote Dun" (76), which we are tempted to say is the most beautiful work of his that we have ever seen, but "The Close of Day" (263) in the gallery leaves one in doubt which to like more. In both the sentiment of landscape is perfectly rendered, with a treatment which seems to indicate that the eye can take in the whole of a broad landscape, without over-accustoming anything. Compared with this, the painting of trees in a landscape (87) in the same room as the first-named of Mr. Davis's, is a very well-known landscape painter, has a very appearance of an aptitude and manner rendered easy by long practice rather than a careful study of nature. The realism of effect in the foreground of No. 87 is very remarkable, but Parton belongs to the school of clever painting with one effect. So does Mr. Graham, who never been more real than in his sea picture (1) of this year—only that we have seen it so often before. Mr. Davis's paintings are, indeed, always recognisable, but there is plenty of individual detail in each; he does not repeat himself. Apropos of the struggle after delicacy of effect we would suggest that the other type of landscape painting has its claims, and it is rare to find a painting as that by Mr. Mark Fisher, "Essex Height" (30), thrust into a corner in the first room. It merited a better place than this. Nor do we understand why Mr. Adrian Stead (206) has been suddenly hidden to "go higher," in the reverse sense from that of the parable, where his apparently delicate work cannot be seen. Mr. Henry Moore interests by exhibiting an inland landscape, "Glen Orchard" (201), which shows in the painting of much the same kind of bold handling which he brings to the painting of seas; or, enough, the torrent in the foreground is the least successful part of a landscape by a painter who has been painting nothing but sea (sea-water, that is), for years past. Mr. D. Murray has never shown better than this year, and if we take his two best works, "Angler" (590) and "Thistle-down" (787), must be struck by the versatility of a landscape painter who can treat with equal success so far apart in sentiment and character "England's Canals" (373), by the same painter, is again quite different in character and composition to the other two, and admirable also in its way. Of the three we prefer the "Thistle-down" picture—

those flat scenes with a large sky which Murray has always excelled in; though we not suppose that will be the popular choice. Among other landscapes to be looked at are Johnson's "Windsor Castle" (320); Mr. W. North's rich wooded scene, "Fritton" (5); M. Macwhirter's "Evening in the Forest, Lisachan" (515); Mr. Macbeth's "Dunster Castle" (550); and Mr. Reid's "The Blind Elder" (852), which is practically a landscape, and which shows a power of giving the impression of "open-air" effect which is very remarkable.

Among sea paintings Mr. Hook is at his best in "The Seely Sheepe" (245), with its foreground rocks and bright mass of tumbling water beyond; Brett is at his best in the beautiful little work, "The Outlook from my Native Cliffs" (2), and not altogether at his best in his large work "The Isles of the Sirens" (409), where the sea is too streaky, though the general effect is very fine. Mr. Somerscales repeats his effect of an open sea in "After the Gale" (593), but not so well with the same effect as at first.

To the sculpture we shall refer on another occasion.

DESIGN FOR A STAIRCASE PAPER.

THIS paper was designed by Mr. Heywood Sumner for Messrs. Jeffrey & Co., by whom it is cut. The design is so arranged that when the complete pattern takes a different form the rake of the staircase to that which it does the levels of the hall and passages. It is an expensive paper of bold and effective design, well suited to its proposed position.

PAINTING AND ITS RELATION TO ARCHITECTURE.*

Continued from page 331.

LOOKING at modern painting we find two main poles, the poetic and the realistic. They are necessarily in conflict, but the critics have determined to consider them so, and have so ordered about them and egged them on, that the painters themselves, I think, have got confused, and we must consider the schools as opposed.

Let me quote a few sentences from modern criticism, they shall all be from the same number of the same Art magazine—the most recent one, therefore, presumably up-to-date. In the *dia* for May, 1893, you will find all the following passages:—"Complete mastery over materials is, after all, not everything—in fact, on the artistic point of view, work only begins here," . . . "unless the feeling is true, the work is not to interest us. Herein lies the whole question of artistic production."

Again, "The world is too big, too grand, too enormous to be ruled by technique."

So far the idealists.

Now hear the other side.

This idea that genius is everything and execution is screwed fast into the skull of every workman. . . .

How very strong is the desire for the ideal in this country, since not even ridicule can crush it. For in what other country would people have shown their taste for art as the aesthetes have here during the last few years. . . .

But the aesthetes, of whom the undoubted head is Burne-Jones, have rendered great service to art of their country. In the search for their riddle puzzles, they have, in making their way, bowed England with a decorating art." (Burne-Jones' puerile puzzles!) Again, "The more an artist relies upon the intelligent use of his pigment, the exclusion of the literary interest, the more will vex those who are unable to follow him."

Lastly, in order to see how this disdain of fine light and beautiful intention in painting rates in actual work, I will turn to a letter which appears in the same number of the magazine, signed by a portrait of the writer.

He is in Spain, in a half-ruined ancient castle, depicted apparently by peasants, and writes as follows:—"While M. aired his Spanish with the representative of the family, I made a sketch of the place, and as I was doing so a shepherd light in a sheep. Tossing it backwards on a cushion chair, he cut its throat, while a woman

held a bowl to catch the blood, to the great delight of a child, who dabbled its hand in the fluid and crowded with glee. This would be made a picture: the tone and gloomy colour the thing was mighty."

This would have made a picture." In the

Being the conclusion of a paper read before the Architectural Association on the 26th ult., by Mr. C. W. Whall.



Staircase Paper: Designed by Mr. Heywood Sumner.

Scuola de San Rocco, at Venice, the mightiest man that Venice ever bore, Tintoret, has painted the whole poem of suffering, and sorrow, and disease, in order to glorify by contrast and by conquest the heavenly art of healing; and to place an emphasis upon his message which shall make it knock upon the coldest heart and dullest mind, and force an entrance by shock and by horror, lest perchance the gate open not to natural gentleness and love, he has not shrunk back or stayed his hand from showing us a scene which well might challenge question: for foremost among those miserables who surround the pool of Siloam waiting for the descent of the healing angel, and for the moment monopolising the

attention of Christ himself, is a group composed of a young woman, gloriously beautiful, but lying in the lap of an old hag whose expression of cold and distressed perplexity, rather than sympathy or love, proclaim her venal and contemptible, and who calls the attention of Christ to the sufferings of her charge, to which it is impossible to allude. Why did Tintoret paint such a scene? Did he say to himself "It will make a picture"? I will tell you why he painted it; and if you know his work yourselves—its unvarying majesty and high-mindedness—you will hardly call me to question. He painted it (and nothing but such motive would ever have induced him to paint it or tolerate it), with high moral and instructive

purpose—to show, for instance, that the most degraded is not outside the love of God, that the most despairing is not to be despaired of; he painted it to bring hope back to the hopeless and shame back to the shameless, by showing that no depth to which we can sink can sink us below the notice and healing of Love, and that the eyes of the Divine Physician are turned towards us, and not from us, by the violence of our malady.

Whenever the great minds of the past have treated of such things, this is the temper in which they have done it. The greatest men of all have never turned towards the seamy side of our life, or the world's life, by a natural inclination and preference, and never present evil, suffering, or disease to our view except with some strong didactic intention.

But it is not worth while to spend much time in warnings against ugliness. Very little of the arts which have been betrayed into the aberration of seeking it has stood the test of time, and in the main it is true that to name the great works is to name the beautiful ones. Still, it is as well to remind you that old forms of painting are being much challenged now; new forms are being started; and people are liable to be carried away by the new, at any time, as the only right thing, and afraid of being called "old-fashioned" and behind the age if they do not. There is a disposition to-day to regard the conquest of difficulty as the only thing worthy of men's admiration. It is true that, whenever a man has done a thing that was hard to do, he has done good to the world—set a good example. But the doing of a difficult thing is not the whole of art. It is difficult to win a race, to conquer in a prize-fight, to climb the Matterhorn, to construct the Channel Tunnel, or to build the Forth Bridge. Why is not the Forth Bridge a work of architecture? It is the largest building in the world, and the greatest triumph over difficulty that the science of building has ever gained. Why is it not a work of art? Simply because it was built without a thought of beauty, and because it is not beautiful. Nor is a painting worthy of the name of art unless it fulfils these conditions.

But what, then, of Hogarth's works, for instance, or those of Teniers?

There is certainly no intention to be beautiful. Do I dare to say they are not art?

I must not in these days, amid such strong conflict of opinions, say anything so calculated to bring my words into contempt. There is a beauty in the actual craftsmanship and fineness of handling in these works that must make them respected—there is the conquest of great difficulty and the evidence of much self-discipline and severe training which must make these things a useful and valuable lesson to humanity, and justify their claim to a place in the stream of our progress. But, having said thus much, I will tell you plainly that, if it were possible to suppose that those men and others like them had it anywhere in them to have spent such fine skill on objects in themselves gracious, then their spending them as they did was one of those countless instances of mistaken effort and misapplied power which through all the ages have at times filled the history of the world with waste and with regret; and I will also tell you this, that I believe if Phidias or Pericles could stand, say, before the "Marriage à la Mode," they would turn away from it as a very strange thing to look upon and a thing full of wonder, but by no means the work of a man who was "in truth taught of the Muses."

I prefer, however, to consider, by reference to more modern work, the problems and questions that press upon us, so I will return to the sheep-slaughtering scene which our impressionist friend says "would have made a picture." I am sure he would have made a very clever picture of it, but let me point out to you two very important things, first, that the greatest leaders, even in that phase of art we are discussing, never give in their works any justification for that disregard of beauty in all else than technique, which has been audaciously put forward by certain painters and critics. Who ever saw Whistler (who towers head and shoulders above the rest), who ever saw Corot indifferent to beauty of sentiment or of form? I would never be for supporting an argument by a mere appeal to great names, but until some man as great as these arises to paint the horrible and the base, we may well go on our way unshaken in our old-fashioned notions of art.

The other thing I had to say comes nearly home to you architects.

It is this: That it would have never become possible for our tourist in Spain to have uttered of the scene he described, "this would have made a picture," had it not been for the lamentable

divorce between the sister arts which has left the cabinet picture to become the isolated and irresponsible thing that it has, and so to fall into the position of a work produced throughout with the fact constantly in the mind that it will have to make its first appeal, and the one on which its immediate success or failure depends, from the walls of a glaring gallery, where it must scramble and jostle for precedence in a spirit of most unworthy rivalry, and that its subsequent history must be to be made a mere movable, and thus sink into the position of a counter in the speculations of the market-rigging and conscienceless dealer. And I think it must be owing to this that many of our painters for years past have been tempted to seek after something that will startle rather than something that will charm. And the reason why I am "happy" to tell you of the decline of the cabinet picture is not my objection to cabinet pictures as such, but only to cabinet pictures as this spirit has at present made them. I said it was the divorce between the arts which has led to this, and I think if you consider you will find it true, for surely any man building his own house, with that culture and refinement which would be implied by his being interested in its architecture, would *ipso facto* be so far educated as to wish to have nothing there but what would be a permanent source of reasonable and dignified pleasure and strengthening and repose; but alas! we live in other men's houses: we are always "moving," or contemplating moving, somewhere else; and really, with everything here to-day and gone to-morrow, we take our dose of pictures every spring in the public galleries and do not pause to consider them as having any permanent place in our lives, do not look to them for beauty or for solace, if for a few moments they spur our jaded souls by curiosity, or horror, or excitement. It is for you to help us in these matters by taking a lively interest in the union of the arts in which lies all our future hope, and by showing us the possibility of surrounding ourselves with seemly and beautiful things generally, and thus make it impossible for the beautiful plant of art, which spreads abroad its branches and puts forth its leaves in splendid and varied crafts, to make its only failure in that which is the crown and flower of all, by painting, which so lamentably misses its mark.

In the commencement of my paper I used all my endeavour to get firmly fixed into your mind the idea of the painter's special craft—the technique, which, to some painters of the present day, seems to be the one thing needful. I also declared my belief that it was needful; that no one without it could claim to be a great painter; but I have been in the latter part of my address to you dwelling on the value and dignity of those other elements of beauty which painting is so eminently well fitted to express, and to neglect which is to resign a portion of its crown: and you will find that painters, as a rule, have valued this skill (if they lived at a date at which it was possible for them to know of it) in proportion as they were seekers after beauty—Raphael more than Michelangelo; Bellini more than Raphael. They "loved that beauty should go beautifully." So also they were the decorators, and if I name those who in these days come nearest to having that quality—Burne-Jones, Watts, Albert Moore, Leighton, Whistler—you see at once that I name the very men amongst painters best fitted to associate themselves with your art in the capacity of decorators. For in truth they are the seekers after beauty. Others may wish to be historical or dramatic or pathetic or domestic or (God help us) comic in their painting; they are bent on being beautiful; they seek that first; all the rest may be "added unto it."

Forgive me for dwelling at such length upon this point, which should be one of the common-places of art; it is astonishing indeed that the utterance of such a rudimentary truth should be needed, but we cannot go through any gallery of modern pictures without seeing that it hardly enters into the popular mind of the present day that art has anything to do with beauty: far less that it has everything to do with it. I can hardly point this out more clearly than by reference to the collected works of two recently-deceased artists exhibited simultaneously a short time back. The one a popular favourite through the whole of his career, crowned almost at its commencement with full academic honours. The other almost universally ignored and neglected.

It is not necessary for me to recall the catalogues of these two exhibitions to your memory item by item; when I mention the names you cannot fail at once to recall the general impression that the first consisted of scenes of violence, con-

spiracy, personal combat, personal challenge, court intrigue, and low comedy in trunk-hose, and that the latter was one harmonious procession of gracious form and colour; that one contained nothing that was markedly and intentionally beautiful, and the other nothing that was otherwise. It superfluously then in me to call attention to the most rudimentary definitions of the purposes of art in an age which so arranges itself that J. P. Pettie should for twenty years have held a position in which it became his duty, from time to time, to give his voice in judgment upon the works of Albert Moore?

Nor can we console ourselves with the thought that it is only this particular nation, and this particular age, which has so erred.

It is a curious fact in the history of the human race that it is always liable to have the highest motives corrupted, and the most magnanimous temper spoiled by being confronted with actual achievement of any kind, in however undesirable a direction.

A nation, penetrated and informed with a love of beauty, and doing everything beautifully for the sheer love of it, will turn its back upon itself in a moment, and disclaim its own past, when accidentally brought into the presence of some new dexterity, even though exhibited in a field not worth cultivating. It will at once relinquish the pursuit of all that it was seeking and despise all that it was producing to follow some skill, not one tenth as fine as its own, which challenges to a competition by its newness. It is hardly too much to say that petty mechanisms and realisms of European work of the last forty years have done more to corrupt the taste of the East. And I cannot resist concluding with an anecdote which has its humorous side, and which brings out this truth into somewhat striking relief.

I was going through Italy some fifteen years ago, studying chiefly the art of the thirteenth and fourteenth century. I had with me as companions two younger men than myself, who were following with younger, but I think not stronger enthusiasm the teaching of Ruskin. However, I was sufficiently older to manage my enthusiasm more cunningly, and the consequence was that I was always poking fun at the other two. However, one of them, a dear young Scotch architect, now, alas, no more, had all the caution and pawkiness of his race, and would generally grasp the situation at once, and give me as good a brought.

I had long recognised in the art of Giotto an intense struggle of the man, and how, with his powers, he must have longed for power beyond them to do the things he must have imagined possible, but knew not how to do about. I had thought, and trembled to think what might have been the result could he have been suddenly brought face to face with the clever realisms of modern art; and one day standing before one of his frescoes, I turned to my companions, and said: "Look here, fellows, to put it shortly, if Giotto could have seen Frith's 'Derby Day' he'd have gone into raptures. I forget what gesture of impatience my enthusiasm made, but the Scotchman just leapt an inch towards me and replied as soberly: "Pr-robably have given it to Dante on his birthday." Well, gentlemen, I think we need contemplate so exaggerated a catastrophe as that for I think—upsetting as I am sure the experience would have been to Giotto—there is one thing that would have kept him right—his architectural sense; but for that I can easily imagine him misled by the plausible dexterity of that celebratory work as to forget that it was not beautiful, but think the union of the arts which was so happily embodied in him must have led him to distrust at once because it was not decorative.

Do not imagine that all I mean by "decorative" is the art which is usually now alluded to under that name. All the finest art is decorative—Veronese no less than Giotto, and what cannot more reposeful and perfect and "liveable" than the eighteenth-century room, with the rich warmth of Reynolds, and the serene grace of Gainsborough amongst its slender mouldings and its dainty white and gold?

Don't, above all things, be narrow, or imagine that I want you to seek for art that is very fresh with a brown outline round the faces and within shadows; but what I do urge you to seek for is art where beauty has been the aim before realistic glorious colour before deceptive light and shadow and graciousness, and sweetness, and dignity, and repose before dramatic fervour, show, excitement and fuss.

It is the cultivation of this temper in you architects

cts that forms the one hope of us painters who, disgraced with the frivolity and ugliness of the ilk of modern work, have been struggling along the despised and neglected path of decorative art. Upon you falls the honourable (but responsible) task of directing the accessory arts, and it is with a real joy that we see so many of you now seriously setting yourselves to learn them. You will be in doing so, even if you learn but one of them, the grounds for a sympathy with your brothers in art, to which you have hitherto been strangers, and by virtue of which you will find them working with you, rather than for you, with the enthusiasm and joy which ever comes with sympathy. And depend upon it, when masonry, when timber and mass and metal and mosaic and sculpture and painting are each advanced to their own proper perfection and completion, and when, being so, they are brought under the direction of a master-builder, whose knowledge of and sympathy with their various excellences has largely helped to make them what they are, we shall soon cease to hear complaints that we have "no style," for, if once the various crafts are used in perfection and used in association, they will soon form their own right style, and being used in sympathy also, the characters which could be stamped upon each one, by virtue of its own perfect craftsmanship, would combine to form one harmonious style for the whole range of the arts.

I have thus endeavoured to make clear to you that I consider the great essentials of painting as of art, and the essentials of its relation to architecture. The two questions are almost inseparable and quite interdependent.

The doing well of what we have to do, the perfect and right use of our tools and our stuff, is a simple ground on which these arts meet—they can't come together at all, except by the similitude and common-sense reasonableness of it at first step; but this once taken, they can, and in-hand, pursue their common aim; and at aim is beauty. And in the pursuit of beauty they gain strength from each other, for all their art history shows that they have ever sought it and successfully when they have sought it in common; and I venture to think that, speaking generally, the past history also shows that the arts have ever attained the highest perfection of it, when, even beyond the attainment of physical beauty, they recognised yet another motive still and referred all their efforts to the standard of a high and noble conception of the whole of human life, domestic, civic, patriotic, and religious, in its completeness and its dignity.

You, builders of our temples and our halls and our homes, you students of our ancient stories, help us to recover that lost inheritance, when you apply to us to join with you in your efforts, do so in this spirit, and let us together apply whatever we can win back of the felicities and dexterities of our noble arts, in portrayal of things worthy of them—the great verities of life and being; in the reiteration of the unchanging force of human aspiration, the affections of the heart that never grow cold, the thoughts that never

fade. We have put before you two things—the technical and the ideal. Both necessary. The one is fine art, the other is fine life.

MAGAZINES AND REVIEWS.*

In the *Art Journal* Mr. Sherard gives an account of the life, with many illustrations of the works, of the Bohemian artist Brozik, an engraving of one of whose works, the very fine painting of the "Communion of the Early Bohemian Protestants," forms the frontispiece to the number. Mr. Joseph Pennell contributes an article on "The Illustration of Books," described as "Notes for a course of lectures delivered at the Slade School, University College." Cheapness of modern processes, Mr. Pennell considers, has contributed to the multiplication of illustrated publications often filled with very poor art, mediocrity being cheapest, and the object of the publications commercial success rather than art. On the other hand, "when one finds the greatest artists in England drawing for a penny paper," we may hope that there is going to be a renaissance of fine illustration in spite of the prevalence at present of so much that is poor. Lady

* The object of these notes is to point out anything in the contents of the current magazines which is of special interest to our readers, with occasional brief criticisms on the views expressed in such articles. When a magazine which has been sent to us is not noticed, it is because that number contains nothing that it is within our province to comment upon.

Dilke furnishes an article on Caldecott, with reproductions from some of his sketches and studies. The second article of the series on "The Royal Academy in the Present Century" will be of special interest this month to our readers, as it deals mainly with the life and works of Sir John Soane, the estimate of whose works, not very flattering, is, we think, tolerably correct. The authors speak enthusiastically, and there also we agree with them, in regard to the little-known interior of his house, now the Soane Museum, and its contents. But Soane had hardly the soul of an artist, and was fortunate rather than great. Mr. F. Miller's article on "Glass Painters" is a good and sensible one, and the illustrations are interesting and to the point. We are glad to see that he takes the right view as to Medievalism in modern glass, arguing that the Medieval artists simply drew as well as they could, and had no intention of being stiff and angular in their figure drawing. An article by Mr. James Orrock is devoted to that great and by no means sufficiently appreciated landscape painter, William Muller. A short article signed "T," on "The Royal Academy and the Prosperity of Living Artists" suggests that the Academy is not doing justice to living artists; that it crowds their pictures together at the May exhibitions so that they mutually injure each other, while it spends large sums in winter exhibitions of Old Masters, which are hung in a manner much more advantageous to their effect. The writer suggests that after twenty-six years of these Old Masters' exhibitions, there should be substituted for them exhibitions of the works of living artists—say, as a beginning, the principal works of Academicians (why only of Academicians?) painted between 1870 and 1880. We will suggest, as an amendment, that such exhibitions of the works of living artists should not displace, but alternate with, the "Old Masters' exhibitions; old masters and living artists in alternate years.

The *Studio* devotes an article, by Mr. Dewey Bates, to that clever, but very unequal painter, Mr. Clausen, and Mr. Baillie Scott writes an article on "the decoration of a suburban house," with illustrations of some very pretty wall-paper and other designs, some of which, however, such as the "Swan" staircase paper, are not decorative in their lines; besides that it is a misapplication of nature to use the suggestion of a stream and a swan on it for a *living* paper, and in a paper, making the swans swim up-hill. "Snow as a subject for the camera" is a good idea, and the photograph of "A Snow Scene," by Mr. H. Johnson, is a beautiful illustration of the effect of photography on a subject of this kind.

The most important paper in the *Architectural Record* is that by Professor Goodyear on "Greek Horizontal Curves," mainly in relation to his own recent observations of horizontal curves in the long sides of the Maison Carrée at Nîmes, but going more or less into the whole subject of curves in Greek buildings. He suggests that the horizontal curve was also intended to have, and actually had, the effect on the eye of a vertical curve, when seen from a standpoint below the side of the temple. The author admits that the explanation of the actual intended purpose of these curves is mystified rather than assisted by the further investigation of the subject, as it is impossible to frame any satisfactory explanation for the existence of curves in one part of a building and not in another, or of the different application of them in different portions of two very similar buildings of the same style and nearly the same date (the Parthenon and the Thesum, for instance). It seems doubtful if we have got to the bottom of it yet. As to the Maison Carrée we must say that we feel a little sceptical; at all events the drawing "from a photograph" made to show the horizontal curve of the longitudinal cornice, shows it rather as a very obtuse angle (as if due to displacement) than a curve; and as some of the illustrations in the article are reproduced automatically from photographs, one is tempted to ask why that process was not adopted in this illustration. It would have been more convincing than the drawing.

The *Edinburgh Review* contains an article on "Saint Sophia and Byzantine Building," ostensibly a review of Mr. Lethaby's book, but the main object of the article is to put the architectural facts as to Byzantine building in a form intelligible to general readers. In the same number an article on "Somersetshire," a review of two recent books on the history and topography of the county, contains a good deal that will interest many of our readers.

In the *Quarterly Review* the article on "A Century of Science" gives a summary of the changed position of scientific knowledge and method since the days of Buckland, whose

biography, along with that of Owen, forms the occasion for the article.

The *Nineteenth Century* contains a very interesting and valuable article by Professor A. E. Wright on "Colour Shadows," by which is meant the effect of "after images" of bright colour on the eye, and especially the effect of bright colour in portions of a landscape on the colour appearance of the less highly coloured or less brightly illuminated portions of the scene. It is an article which ought to be of considerable interest to painters.

In the *Century* the article on "Beyond the Adriatic; a New Field of Travel," with Mr. Pennell's sketches, is continued, and deals with places and buildings much less familiar than Spalato, which was the main subject of the last paper.

To Harper M. Royal Cortissoz contributes an article of considerable interest on "The Museum of the Prado" at Madrid, the illustrations to which remind one how many splendid and world-renowned works of Velasquez are there enshrined. "In Sunny Mississippi," by Mr. Julian Ralph, is one of those topographical articles which frequently appear in American magazines, and which are made very interesting by the numerous sketches which accompany them, including a good many of interior and exterior architecture, among which the interior of "the Senate-Chamber at Jackson," a circular colonnaded apartment, looks as if it ought to be a remarkably graceful room; whether it would be a good one for its purpose acoustically is doubtful.

"French Posters and Book Covers" is the subject of an article by M. Arsène Alexandre in *Scritures*; a subject which is getting rather worked out in a literary sense, but the piquancy and variety of designs in this department of French art seems almost endless. M. Raffalli's short article on "Impressionism" is interesting for some reminiscences of Manet and of the early conditions of the movement, but has no critical value. Of "Wood Engravers" M. Pannemaker is the one dealt with this month, and his powerful engraving of Velasquez's Head of a Pope, at the Doria Gallery, which forms the frontispiece to the number, is a full justification of the importance attached to his work in the article. In an article on the question "Will the Electric Motor Supersede Steam?" (for travelling more especially) Mr. Wetzel answers in the affirmative: for his reasons we must refer our readers to the paper.

In the *Monde Moderne* we meet again with the subject of "L'Affiche Moderne," with a number of illustrations of posters, all clever, some vulgar, some very graceful, and all entirely new to us. An article on "Le Breviame Griman" gives a number of reproductions from the pages of this celebrated illuminated book. Another article describes "Le Cabinet des Estampes de Paris." We may direct attention also to the article on "Des Grands Effets de Lumière," in connexion with photography; that on "L'Evolution des Industries d'Art," with some remarks on the search for a new decorative style; and the illustrations accompanying it; that on "Nos Arsenaux," and one on "Coins Ignorés du Comte de Kent," a very unusual kind of article to find in a French magazine.

The *National Review* contains a rambling and incoherent article by Mr. Pennell on "The Condition of Wood Engraving," in which it is impossible to find what the writer is driving at for two sentences together, except that he is very angry with something or somebody.

Scots Lore contains a long article by Mr. P. Macgregor Chalmers on what he believes is the discovery of the remains of the original Church of St. Niman, at Whithorn, "the first Christian church in Scotland erected of stone." We have not space to refer to the points of the argument here, but archaeologists will find the article of some interest. It is proposed to investigate the site further.

In the *Gentleman's Magazine* is an article on Pevensey Castle, under the title "A Medieval Stronghold," by Mr. Arthur W. Beckett. The *English Illustrated* contains a preposterous suggestion by Dr. Joseph Parker, "of the City Temple," as to a general rebuilding of London, and an interview or "morning call" on Lord Ronald Gower, whose position and importance as a sculptor are, we must beg to say, absurdly over-rated.

The *Essex Review* contains an article on the little brick Church of St. Nicholas, Chignal Smealey, with a nave 23 ft. long and of two bays. Some details of brickwork, &c., are given. It would add to the interest of these articles if a general perspective sketch, or a reproduction

from a photograph, of each church, were given with the article.

The *Antiquary* continues the series of articles on "English Glass-making in the Sixteenth and Seventeenth Centuries."

The "Pictures from *Punch*" continue to appear monthly, and the last number revives for us a good many excellent and well-remembered sketches of an earlier period.

The *Fortnightly Review* contains a short article on "The Bach Festival," being a critical note on some points in connexion with Bach's works and the scheme of the Festival, by Mr. H. H. Statham, which may interest some of our musical readers.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS:

THE ANNUAL REPORT.

THE Annual General Meeting of the Royal Institute of British Architects was held on Monday, at No. 9, Conduit-street. The annual Report of the Council, which was adopted, contained the following passages:—"The Council have held twenty-five meetings since the adoption of their last report by the annual general meeting of May 7, 1894, exclusive of meetings held by Committees of the Council.

The death of Wyatt Papworth, who with his father John B. Papworth and his brother John Woody Papworth, were most indefatigable workers on behalf of the Institute, caused the deepest sorrow to the Council, with whom he had so long been associated. That of Ewan Christian, a Royal Gold Medallist, President in 1884-86, and one of the oldest members of the Institute, has been severely and widely felt; and the Council fully concur in the graceful tribute paid to his memory by Mr. Macvicar Anderson and Mr. G. H. Birch. The loss of Sir Henry Layard, an Hon. Fellow, who had been connected with the Institute for forty-four years, who received the royal gold medal in 1868, and whose services to architecture were so well known, is also to be deplored.

The Fellows now number 604, and Associates 921. During the twelve months five Fellows (who were previously Associates) and 91 Associates (19 of whom were previously Students) have been elected. Three Hon. Associates—Alfred Gilbert, R.A., F.G. Hilton Price, director of the Society of Antiquaries, and W. B. Richmond, M.A., A.R.A., have been elected; and six Hon. Corresponding Members—Charles Buls (Brussels), Barr Ferree (New York), Alois Hausmann (Budapest), Henri Edouard Naville (Geneva), Emerich Steindl (Budapest), and Louis Viollier (Geneva). There are now sixty-one Hon. Associates and fifty-five Hon. Corresponding Members.

The number of Students has increased to 143, as against 101 at the corresponding period last year, and the number of Probationers to 736, as against 577 in 1894.

The loss to the Institute by death during the year has been as follows:—Fellows—Charles Aldridge (Liverpool), R. C. Baxter, Lawrence Booth (Manchester), T. E. Bridgen (Manchester), Ewan Christian, W. G. Coward (Sydney), C. G. H. Kinnear (Edinburgh), Arthur Lett, J. C. Moncrieff (Bristol), James Murgatroyd (Manchester), E. G. Paley (Lancaster), Wyatt Papworth, and Ernest Turner; Associates—Arthur Cawston, A. H. Clark (Norwich), C. H. Cooper, Morton M. Glover, H. A. Gregg, H. A. K. Gribble, J. G. Hall, Frederick Hemmings, Gordon M. Hills, and J. A. Macara; Hon. Associates—Henry Fajia, W. Calder Marshall, and Alfred White; Hon. Fellow—Sir Henry Layard.

The Council, having appointed a committee to consider the question of the hon. associate class referred to in the President's opening address, have approved in principle the establishment of an additional class of members who shall be craftsmen in the arts allied to architecture; and have referred the matter back to the committee to work out. The Council hope, before the close of the Session, to bring forward a scheme for the consideration of the Institute.

The Preliminary examinations of November, 1894, and March 1895, were held in London, Bristol, and Manchester, and the 217 successful candidates have been registered as probationers. The Intermediate examinations were held in London on the same dates, when fifty-seven probationers passed, and were registered as students. Examinations qualifying for candidature as Associate were held during the week commencing November, 26, 1894, in Man-

chester, Bristol, and Glasgow, when sixty-four passed. The first of the Final examinations qualifying for candidature as Associate was held in London and Manchester from March 29 to April 6, 1895, when out of the eighty-six applicants who attended twenty-six passed. The Council again tender the thanks of the Institute to the Board of Examiners for the arduous services rendered by them, and to the allied Societies at Manchester, Bristol, and Glasgow.

The Ashpitel Prize was awarded to Mr. W. E. Vernon Crompton, Probationer, 1891, Student 1892, Qualified as Associate 1894, he having most highly distinguished himself in the Qualifying Examinations held in 1894.

As a concession to probationers who are students of the Royal Academy, the Council, acting on a recommendation of the Board of Examiners, have decided to permit such students, in lieu of the testimonies of study required in the Art Section, to submit their Academy drawings, provided they include sufficient studies of Gothic work to cover the requirements of the Section.

A statutory examination for Certificates of Competency to act as District Surveyors in London, and as Building Surveyors under Local Authorities, was held in October, 1894. For the former two candidates presented themselves, but neither passed. For the latter there was but one candidate—Mr. Francis Baugh Andrews, Associate,—who was granted a Certificate of Competency.

The Royal Gold Medal (1894) for the promotion of Architecture was presented to Sir Frederic Leighton, Bart., P.R.A., on June 25, 1894. By a resolution of the Institute passed on March 11, 1895, Mr. James Brooks, Vice-President, was elected Royal Gold Medallist for the current year, for his executed works as an architect; and Her Majesty the Queen has graciously signified approval of the award.

The prizes and studentships 1894-95 attracted an unusually large number of competitors. The deed of award made by the Council under by-law 66 was read at the general meeting of January 7. The designs and drawings were publicly exhibited in the larger Conduit-street Gallery from Jan. 4 to 14. Previous to the distribution of prizes, the President delivered the annual address to students, which was followed by a critical paper from Mr. J. M. Brydon on the competitors' works. The task of reviewing the essays placed second, third, and fourth was kindly undertaken by Dr. Frank Granger, of Nottingham. While on this subject the Council cannot refrain from acknowledging, on behalf of the Institute, the studentships generously placed at their disposal by Mr. T. W. Aldwinckle.

As in former years, a selection of the prize drawings was forwarded to the allied societies at local centres. It included, from the measured drawings, the elevation of the gateway of St. John's College, Cambridge, by Mr. W. H. Ward (silver medallist), and elevations, &c., of Llandaff Cathedral, by Mr. J. H. James; the Soane medallist Mr. H. S. East's design for a picture gallery, and perspectives for the same subject by Messrs. C. H. B. Quennell and H. Jeffries; a selection of the Tite prize drawings by Messrs. R. Shekleton Balfour (Tite prizeman), Banister F. Fletcher, W. T. Conner, and D. W. Kennedy; several drawings by Messrs. A. J. Dunn (Pugin student), J. A. R. Inglis, and C. C. Brewer; and drawings, sketches, &c., of the Owen Jones student, Mr. J. J. Joass.

By the courtesy of the French Government and through the good offices of Monsieur Daumet, then President of the Académie des Beaux-Arts, the Council were able to borrow a remarkable series of drawings of the Pantheon executed by Monsieur Chedanne, a "Pensionnaire" of the Academy of France at Rome. These drawings—of rare excellence—were hung in the smaller gallery from January 7 to January 14, during the time the works submitted for the Institute prizes were on view, and advantage was taken of the opportunity of inspecting them by a large number of members and the outside public. Mr. Phéné Spiers at the meeting of January 7 gave a description of the drawings, and at the meeting of the 14th, when Monsieur Chedanne was present, read a paper giving an account of the artist's researches at the Pantheon, and of his restorations of that monument. At the meeting of January 14 there was also exhibited a collection of drawings of the late Mr. H. A. K. Gribble, including his designs for the Brompton Oratory.

Mr. Poynter, R.A., having, on behalf of the Society for the Preservation of the Monuments of Ancient Egypt, invited the Council to appoint one or more members to sit on a committee for considering the best means of carrying out the

proposed archaeological survey of the Nile Valley from Assuan to Korosko—such survey to include the copying of all inscriptions, the photographing of all ancient structures and remains, and the examining of all foundations—the Council, sympathizing with the objects of the Society, nominated Mr. Arthur Cates and Mr. Phéné Spiers to act on the Committee; and these gentlemen have attended some of the meetings.

On July 2, an anniversary dinner, in commemoration of the first general meeting of the Institute in 1834, was held at the Whitehall Rooms of the Hotel Métropole, the President, Mr. F. C. Penrose, in the chair. Over 200 members and guests were present.

In compliance with the request of Dr. Moline, Hon. Secretary of the British Committee for the International Congress of Hygiene and Demography held in September at Budapest, to send delegates to the Congress, the Council appointed Mr. T. W. Cutler and Mr. John Slater to attend on behalf of the Institute; but Mr. Cutler was unable to be present at the Congress, but Mr. Cates kindly consented to take his place.

On October 20 the Council received a deputation from the London Lodges Committee for Operative Stonemasons, which stated certain grievances of the London stonemasons through the practice of working stone, intended for London buildings, at the quarries. It was objected, among other things, that quarry-worked stone was usually rough, and that much of it had to be rejected; that it was frequently injured in packing or during carriage, &c., and had afterwards to be 'doctored up' to fit it for its purpose; that the stones worked at the quarry were often taken from the softest beds, and that, as the wages of the quarry-masons were lower than the London rate, the contractor for works in the metropolis derived a pecuniary advantage by using this inferior stone. The Council in their reply stated that, as a rule, it was desirable that stones should be worked near the building for which they were required, so that they could be inspected by the architect while being worked.

In consequence of the conditions now attaching to the appointment of district surveyors in London, debarring them from exercising their professional rights as architects, the question arose whether, under the charter, district surveyors appointed under the new regulations were eligible for admission as Fellows. The matter was referred to the Institute solicitors, Messrs. Markby, Stewart & Co., for counsel's opinion. A case was prepared and submitted to Mr. Arthur Cohen, Q.C., who gave a written opinion that unless a district surveyor had, prior to his appointment under such regulations, been in independent practice as an architect for seven successive years, he was not eligible for the fellowship.

On November 4 the Council directed the attention of the London County Council to the continued paucity of applicants for certificates of competency to act as district surveyors in London, and to their want of knowledge; and at their General Meeting of December 3 a paper was read on the subject by Mr. W. D. Caroe, when a resolution was passed to the effect that the high status of district surveyors should be maintained, by allowing them the right of private practice as before. The result of the meeting was duly communicated to the London County Council, who, in their reply, expressed their determination not to reopen the matter. The Council have since appointed a Committee, consisting of Messrs. W. D. Caroe, T. W. Cutler, Lacy W. Ridge, Charles Fowler, and T. H. Watson, to consider the position of district surveyors in face of the conditions imposed by the London County Council; and an interim report has been received from the Committee.

The Council, being empowered under section 175 of the London Building Act, 1894, to appoint one of the three members forming the Tribunal of Appeal, appointed Mr. Arthur Cates to the office in December. The other members are Mr. D. Cubitt Nichols, appointed by the Secretary of State for the Home Department, and Mr. T. Chasfield Clarke, appointed by the Council of the Surveyors' Institution. Mr. Cates was subsequently elected Chairman of the two Tribunals constituted under the London Council General Powers Acts of 1890 and 1893 from their commencement.

A Bill for the Registration of Architects, promoted by persons whose names are not disclosed, has been introduced into the House of Commons by Mr. Atherton Jones, M.P., and read a first time. The petition against it, on

behalf of the Institute, was duly presented by Sir Richard Webster, Q.C., M.P., who, with Mr. Greime Whitelaw, M.P., and Mr. James Campbell, M.P., has given notice of opposition to its second reading.

The formal declaration of trust, bearing the seal of the Duke of Devonshire, and setting forth the conditions under which his Grace has made over to the Institute the valuable collection of original architectural drawings by Palladio, Wignola, Inigo Jones, John Webb, Kent, and others, was signed by the Duke on December 17, 1894. The declaration states that the collection shall at all reasonable times be open for the purposes of study and reference to all present and future members and students of the Institute, under such rules and regulations as the Council may deem necessary or expedient. By clause 6 the Institute is required to insure the collection against loss or damage by fire and other accident, in the sum of 400l. The declaration of trust and the schedule of the contents of the various portfolios and boxes comprising the collection are printed at page 185 of the *Journal*.

The Art Standing Committee report that ten meetings have been held since the publication of the last annual report, and seven since the election of the present committee. The committee appointed Mr. Alfred Waterhouse, R.A., Chairman, Mr. James Brooks, Vice-Chairman, and Messrs. W. D. Caroe and George Kenyon, Hon. Secretaries. In view of the fact that one or two, possibly, two important new bridges across the Thames at Vauxhall and Lambeth were in contemplation by the London County Council, the committee gave special attention to the matter with the object of securing for London structures of monumental dignity worthy to rank with Waterloo and London Bridges. Although the committee regret that their endeavours to secure stone structures have been unsuccessful, they nevertheless desire to record their sense of the courtesy and attention with which their views have been received by the Bridges Committee of the London County Council. They set to view all the Metropolitan Bridges, and, with the sanction of the Bridges Committee of the County Council, a deputation introduced Mr. Macvicar Anderson attended at Spring Gardens last May. Subsequently, by invitation of the Bridges Committee, a second deputation attended at Spring Gardens, which led to the Council of the Institute sanctioning co-operation, suggested by the Bridges Committee (subject to the Council's approval), in the production of a design. To this end the engineer of the London County Council has furnished the Art Committee with the structural details of the proposed bridge, and they now have the matter under their consideration.

Mr. Seth Smith's proposal for a permanent gallery of British Architecture was referred to the Committee by the Council for consideration, and the committee requested Mr. Seth Smith to send and give his views. The matter was then considered, and it was deemed advisable to postpone the subject until something further was known of the public interest taken in the Architectural Exhibition, now being held at Liverpool, under the guidance of the recently-appointed Professor of Architecture, Mr. F. M. Atwood.

The Literature Standing Committee report that at their election on June 11, 1894, they have held nine meetings, making ten meetings together since the issue of the last report. They elected Professor Atchison, A.R.A., Chairman, Mr. Alex. Graham, Vice-Chairman, and Messrs. A. S. Flower, M.A., and R. Elsey Whit, Hon. Secretaries.

Arrangements have been made by the committee for the better preservation of the collection measured drawings for which the Institute report medal has been awarded.

The committee desire to call attention to the large number of interesting and valuable works presented to the library during the official year. The Librarian's report to the committee is as follows:—

During the twelve months elapsed from April 1, 1894, to March 31 of the present year, the total additions to the reference library amounted to 134 volumes and seventy-five pamphlets, and to the loan library twelve volumes and two pamphlets, exclusive of parts of works issued in a serial form now in progress. The number of volumes presented to the reference library was ninety-two, and to the loan library three. Of pamphlets, seventy-seven were presented to the reference library, and two to the loan library. Of drawings, engravings, and photographs, seven sheets and four books were presented, exclusive of the "Sketch-book of the Architectural

Association." There were also presented two medals struck by the Corporation of the City of London. The works purchased comprised forty-two volumes, two pamphlets, and one book of drawings, for the Reference Library, and nine volumes for the Loan Library, together with several Parliamentary papers. The attendances of readers in the library numbered 2,838 (last year 2,411), showing an increase of nearly 18 per cent. The number of tickets (exclusive of renewals) issued for admission to the Reference and Loan Library was eighty-three (last year ninety-three). The number of volumes issued on loan was 986 (last year 976). Where so many useful and valuable additions to the library have been made by donation, it is hoped it will be not invidious to make special mention of a second copy of the Architectural Publication Society's "Dictionary of Architecture," presented by Mr. Arthur Cates; M. Van Ysendyck's great work entitled "Documents Classés de l'Art dans les Pays-Bas," presented by the author; the fine volume illustrating English and Welsh Cathedrals, presented by the proprietors of the *Builder*; and Part VII. of the "Jeypore Portfolio of Architectural Details," presented by His Highness the Maharaja of Jeypore, a worthy continuation (and probable completion) of the preceding parts of this fine work. The new Metropolitan Building Act has called forth several text-books on the subject, and those by Messrs. Craies, Dicksee, Fletcher, Statham, and Griffiths and Pember, have already been presented. Mention must also be made of a very interesting collection of views of Chinese buildings, presented by Mr. F. M. Gratton. The question of binding into a volume a similar collection of photographs of buildings Sydney, N.S.W., was, by resolution of the committee on March 8 last, remitted to the Sub-Committee on the Library, and being highly desirable as a means of preservation for, and ready reference to, the plates, it is much to be hoped it may be sanctioned and form a precedent for similar cases. Among the purchases may be especially noted Burdett's "Hospitals and Asylums of the World," a valuable work much asked for by readers, and on several occasions recommended for the Committee's sanction as a purchase. The additions to the Loan Library, though less numerous than could be desired, have for the most part been works really wanted to meet the needs of readers and the increasing demand for standard text-books.

The library rules have been under the committee's consideration, and a fresh set were finally sanctioned by the Council. The new rules were published in the "Kalendar," and have been since hung up in the library. The committee, in pursuance of a resolution of the Council, have considered the general development of the library, and how far it met the convenience and requirements of members and others using it. Their recommendations were duly reported to the Council, by whom they were approved and ordered to be carried into effect.

The Practice Standing Committee report that they have held six meetings since the issue of the last report. They appointed Mr. Henry Currey, Chairman, Mr. Arthur Cates, Vice-Chairman, and Mr. Henry Cowell Joyce, Hon. Secretary. Their attention has been chiefly directed to the further consideration of the form of building contract and schedule of conditions, which have at length been completed and reported to the Council. During the long deliberations of the Select Committee of the House of Commons on the London Streets and Buildings Bill of the London County Council, the Institute was represented by three members of the Practice Committee, Messrs. Cates, Hall, and Rickman, and the committee feel that the Institute may be congratulated on the fact that its labours with relation to this subject have had a material effect on the provisions of the Act as passed.

The Science Standing Committee report that eight meetings have been held during the present session, and there has been an average attendance of eleven members. They appointed Mr. P. Gordon Smith, Chairman, Mr. T. W. Cutler, Vice-Chairman, and Messrs. H. D. Searles-Wood and William C. Street, Hon. Secretaries.

In connexion with the Fund for Experimental Research, the committee has advanced its scheme for making tests of brickwork, by which it is intended to establish what ratio exists between the strength of individual bricks and that of brickwork composed of similar bricks in different kinds of mortar. Professor Unwin has kindly joined the sub-committee, which is entrusted with the details of the proposed experiments, and thanks to the liberality of Sir William Arrol in providing the expensive and necessary apparatus, it is expected that a commencement will be made immediately.

At the invitation of Professor Banister Fletcher, and with a view to the encouragement of good workmanship, the Science Committee have assisted at the Building Trades Exhibition held at

the Royal Agricultural Hall. A loan collection of pictures and models from the Institute is included in the exhibition, and several of the members of the committee have acted as judges of the handicraft competitions, and awarded the prizes, which were presented to the successful competitors by the Duke of Fife.

The income and expenditure account and the balance-sheet for the year ending December 31, 1894, were appended to the report.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held in the County Hall, Spring Gardens, on Tuesday, Mr. Arthur Arnold, the Chairman, presiding.

The Works Committee and the Cost of Work.—The greater part of the sitting was devoted to the consideration of a long report of the Works Committee, which included a report of the Works Manager, Mr. T. Holloway. The report of the Committee showed that as a result of the operations of the Works' Department, extending over two years, there has been a net loss of 2,777l., but that in regard to two of the works carried out—viz., Council-buildings, Vablesy-street, Poplar, and West View Cottages, Blackwall-lane, a very considerable excess over the corrected estimates has resulted—in the first instance 25 per cent., and in the second 303 per cent. The report shows that the cost of nearly every work carried out above ground has exceeded the estimates, though, on the other hand, sewer work, especially in the case of the Fleet storm relief sewer, has cost considerably less than the estimates. We give the following paragraphs from Mr. Holloway's report, which deal principally with the excess over estimates in the case of the Vablesy-street buildings and West View cottages, these two works being numbered 1 and 2 respectively:—

"When these works were commenced in June, 1893, the Works Department had only just been established. There was practically no office accommodation, and with the exception of myself and two clerks the whole of the staff had yet to be engaged. We had no scaffolding, plant, or tools of any description, and no stores, workshops, or machinery, and I have no doubt whatever that the loss on this account was considerable. Another cause is that when the estimates were made up for these works, the prices were based on the assumption that the workmanship and materials to be put in them would be accepted as satisfactory providing it was equal to that in the best specimens of buildings of this class in London. This, however, was found to be a delusion, and instead of workmanship and materials of good ordinary quality being approved, workmanship of the highest standard and materials of the very best quality were demanded by the officers supervising the works. We had the greatest difficulty in obtaining bricks which were considered satisfactory. Freight after freight of stocks which had been approved of for colour for the work, and from which it was intended to select the facings in the usual manner, were condemned as unfit for facings on account of their not being sufficiently hard, or when hard enough, the colour was not sufficiently bright. Owing to this difficulty in obtaining satisfactory facings, the outside walls could not be built at the same time as the inside, the latter being racked back from the external walls, and to avoid further loss on this account, second mals were purchased at a cost of 12s. per thousand more than we were paying for the bulk of the bricks, and from which bright stocks suitable in every respect for facing could have been picked. The same rig'd line was drawn with respect to the carpenters' and joiners' work. Instead of being allowed to use imported scantlings for floors and roof-framing, which is invariably used for the purpose, most of these had to be cut from deals and planks, adding at least 50 per cent. to the cost, and this was all subjected to the most minute examination, and the smallest amount of sap or shake was sufficient to condemn it. In the case of the joiners' work this supervision was, if possible, more stringent; the work was frequently inspected in the shops and had to be delivered on to the site unprimed, and if a particle of sap or sign of a shake was visible, even if it was in that part of a door or window frame that would be built in or covered by brickwork or linings, it was considered sufficient to condemn it. The other trades were subjected to the same rigorous inspection, the letter of the specification being strained to its utmost limit. This line of action may have been prompted by the desire on a part of officers to discharge their duties in the most zealous manner, but it had a most disastrous effect on the cost; and if the system had been specially designed to make the work carried out by us cost as much as possible, nothing could have been invented better calculated to bring about that result. There is another cause which is, in a large measure, responsible for the

excess, and that is the very heavy bill for wages, which in No. 1 amounts to 5,900*l.*, and in No. 2 to 14,000*l.*, or about 50 per cent. of the total cost in each case, which is 10 per cent. more than it should be; and it is quite certain that in these two cases we did not get the amount of work done by the men that we had a right to expect." The manager then refers in detail to each work, the cost of which has exceeded the estimate. In regard to the painting of Hammersmith Bridge, he says, "I can only repeat the substance of my former reports, viz., that owing to the work being done in mid-winter and to the excessive amount of wet weather which prevailed whilst the work was in progress, the fresh paint was so damaged by the rain that a large portion of the ironwork was painted six times instead of four. There was also a heavy loss on the gilding on account of the exposed position during this inclement season. The gold sizing had to be done several times over, and a lot of the gold was blown away or spoiled by the continuous rain. Further, owing to the state of the weather the work was in hand at least one-third longer than it otherwise would have been, the men only making on an average eight through thirty hours per week, less than two-thirds of their proper time. On this account the charges for foreman, timekeeper, barges, lightermen and other current expenses which were bound to go on, formed a very much larger percentage of the cost than they would have done had the work been done at a more favourable time of the year. There was also a considerable amount beyond that contemplated expended in scaffolding, as I considered scaffolding would only be required to the towers; but we had to erect it the whole length of the bridge on both sides for extra safety to the men and to comply with the engineer's wishes." The report of the manager concludes as follows:—"In the first two, on which a very large proportion of the excess has been incurred, it is due in a large measure to the very stringent supervision to which the work was subjected. The other portion of the excess is due without doubt to the fact that for some time after the Works Department was established, there was a tendency on the part of the skilled workmen in our employ not to do the same amount of work for the Council as they would be expected to do for a contractor, and it was only after repeated dismissals that this idea was shaken. The men were evidently under the impression that the foreman had not the free hand in dealing with them that a foreman usually has, and there is no doubt that in some instances the foremen were also under the impression that the conditions were different. As soon as possible the services of the men who had charge of the works that had cost too much were dispensed with. This tendency to a minimum amount of work for the maximum of pay has, however, been principally confined to the skilled workmen; with the unskilled labour there is, generally speaking, no cause for complaint. This is borne out by the results of the different works, where it is shown that on nearly all our works where skilled labour has formed the chief item in wages, the results have been unsatisfactory; but, on the other hand, where the work has been of such a character that unskilled labour has been largely employed, such as sewer, road and paving works, we have invariably done well. As an instance of this I may mention that the saving on the Fleet storm relief sewer, amounting to 5,600*l.* (which is a fair and reasonable profit on work of this nature considering the great risks that are involved, and which if not properly handled may result in heavy loss), is more than swallowed up in the deficit on the cottages at East Greenwich. In connection with this matter I am afraid the visits of individual members of the Council to our works, who enter into conversation with the men employed there, is apt to be misconstrued. Some of the men store up their grievances, real and fancied, until Councillors go on to the works, when they are related, and often, I am afraid, in a most exaggerated form. Several of the foremen have complained to me of the bad effect this has on the men, and have stated that their authority over them is very much diminished owing to the misconception the men place on the effect which the relating of their grievances to these gentlemen will have. This effect is a most pernicious one; and while I do not wish to place the slightest barrier to any real cause of complaint being fully investigated, I am sure very much better results would be obtained if members of the Council would, on visiting the works, refrain from entering into conversation with the men, who have ample means for stating any grievances under which they think they suffer. It will be seen, however, on comparing the total cost of the works with the corrected estimates, that in spite of the unfavourable conditions with which the department has had to contend, the deficit on the first two years' working is very small. The value of the work based on the corrected estimates after the adjustment of additions and deductions is 176,086*l.* 17*s.* 11*d.*, whilst the total actual cost, including the initial expenses in starting and organising the department, is 178,863*l.* 18*s.* 6*d.*, or a deficit of about 2*l.* per cent."

The Committee, in concluding their report, acknowledged that the "most unsatisfactory work with which the Committee has to deal appears to be that of painting. It is clear that painting can-

not be done by the Council at the lowest competition prices." The conclusion of their report was as follows:—

"The Committee are satisfied that the painting they do is superior to that done under ordinary contract conditions, but at the same time they are also satisfied that in some cases the painters employed by them have not done as much work as they ought. Steps have been taken to remedy this fault by checking and measuring up the work done from time to time. On the other hand, the Works Committee believe that their men have been compelled in certain instances to paint work in a more expensive style than was necessary. The brickwork and the joinery have also cost more for labour than they should. The Committee does not wish to put the whole blame on the workmen engaged, for the Council certainly obtains work from them of the highest quality. It appears difficult to persuade a workman employed by a public authority to execute any but the highest class of work, even in a second or third-rate building. This fact adds to the difficulty of the Committee carrying out work at competitive prices. In plain work, such as excavating, foundations, road-making, concreting or sewer work, where quality of workmanship cannot vary much, it is clear that work can be undertaken at contract prices. The value of the work now in hand amounts to 230,544*l.*, and, although it is not possible to state anything definitely, the manager believes on the whole that the total cost will be below the total estimate. As to the purchase of the plant and materials, the Committee believe that they have organised this on a thoroughly business-like footing. Merchants and manufacturers are anxious to deal with the Committee, and they certainly give the most favourable quotations. Tenders are obtained for all materials required with hardly an exception, and it does not appear possible for anyone to buy on better terms. The central works unfortunately are far from complete, and it appears certain that it will be at least another six or nine months before everything is in going order. The space at our disposal is very limited and cramped, and thus it is only possible to erect the new works in a piecemeal fashion; the ordinary work is being done at the same time at every part of the yard. The extension of the wharf an average of 73 ft. into the river is progressing favourably, and it will form a valuable addition to the Council's property. We recommend—

"That in the cases in which the actual cost of the above works has exceeded the original or amended estimates, the amount expended in connexion with the works be approved."

Lieutenant-Colonel Ford moved as an amendment that the following words be added—

"And that the report of the manager of works set out in this report be referred to each of the Committees upon whose recommendation any of the works referred to in this report have been carried out, with instructions to report to the Council without delay."

Sir J. Blundell Maple, M.P., seconded.

A long discussion followed, which has been reported at considerable length in some of the daily papers, and under these circumstances we need not devote any space to it.

Colonel Ford's motion was lost on a division, 60 voting for it and 69 against.

Mr. Westcott then moved to add these words to the Committee's recommendation—

"That the Committee be instructed to prepare and bring up a report making suggestions for preventing estimates being exceeded in future, and that the Works Committee do report forthwith the particulars of the jobbing works done during the existence of the Works Committee, together with the value placed on such works by the officers under whose orders and directions such jobbing works have been carried out."

Dr. Collins seconded, and the amendment was agreed to.

Mr. Beachcroft moved to add words to the effect that the Council found no reason for attributing to the architect or his department any responsibility for the increased cost of the buildings in Yabsley-street and Blackwall-lane.

In this connexion the Public Health and Housing Committee brought up a report containing another report from the architect, Mr. Thomas Blashill. In the course of this report, Mr. Blashill said he had no doubt the manager had made his statement as to the relations between the workmen and the members of his committee under the gravest sense of responsibility, and he saw no reason for differing from it. He was, however, strongly of opinion that he might have attached more importance than he did to the circumstances under which the Works Department was called hastily into being. He had strongly advised that in the first instance, small jobs only should be undertaken, so that experience might be gained. But when the Works Department was organised it was found necessary to apply it with the

whole of the work that could possibly be handed over to it. Much of its earliest work was necessarily experimental, and some of its methods were, in his judgment, not calculated to be successful. It would be quite unfair to charge against the workmen the whole of the excessive cost of labour. A very large proportion of this excessive cost was really due to delay in the purchase and delivery of particular materials, and to the purchase from different makers of the several parts of the same fitting, which parts when brought together could only be adapted by altering them upon the job. A good deal of material was actually sent down to the job which was not wanted there at all. He had no means of knowing whether that had been charged to these jobs. A good deal of work was executed in spite of his warning that it was being wrongly done. No doubt the cost of making that good was charged to the job.

Colonel Rotton seconded the amendment, which was supported by Alderman Ritchie, who said that the position occupied by the architect was a most anomalous one.

After further discussion, the closure was passed, and 60 voted for, and 47 against, the amendment. A division was called, when there voted 60 for and 52 against.

Mr. Taylor moved a further amendment exonerating the works manager and his department.

Mr. Buras seconded, on the ground that the whitewash of the architect's department was unnecessary.

Sir John Lubbock said he had never attacked either the works manager or the department; he had only attacked the principle. The loss was not 2,000*l.*, but 16,000*l.* It was absurd to suppose that the money had been lost without somebody being responsible.

On a division, 54 voted for and 54 against.

The Chairman said that under the circumstances that the Council had resolved to have a further report upon that matter, he had decided not to give his casting vote.

It was now after seven o'clock, and the debate stood adjourned. The Council shortly afterwards rose.

Illustrations.

THE PALACE OF BHOWNUGGER.

THE Palace at Bhownugger is for His Highness Takhtsinghi, G.C.S.I., Maharajah of Bhownugger, who is one of the most enlightened and advanced of the Native Princes of India. He visited England the year before last, and was most cordially received by Her Majesty the Queen. He was present at the opening of the Imperial Institute, to the funds of which he was a most liberal contributor. He also had the honorary degree of LL.D. conferred upon him by the University of Cambridge.

He has hitherto expended his surplus revenue in the improvement of his State by the construction of railways, schools, public libraries, and hospitals, and is now wisely providing a suitable home for himself.

The Palace will comprise on the ground floor State reception and banqueting rooms, a picture gallery, Durbar hall, and secretarial offices. His Highness's private rooms, and zenana, with separate entrances to, and internal communication between, each department, and on the first floor His Highness's private rooms, and room for ladies of the zenana, and their reception-room and servants' quarters.

The roof will have terraces and walks all round over the verandahs.

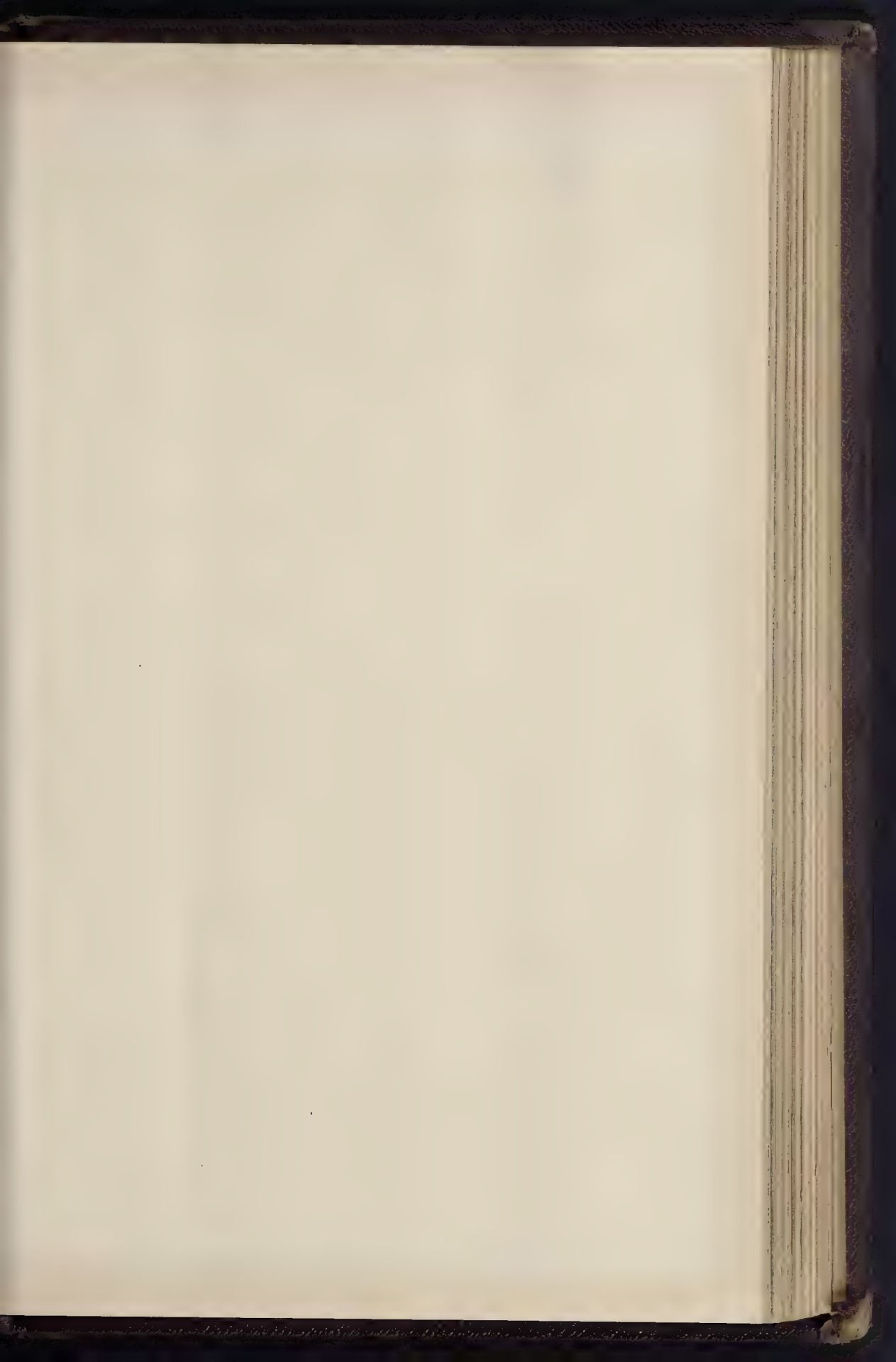
The Durbar hall will be constructed of a fine grey sandstone, with an intermixture of stone of a reddish colour, and the exterior masonry of the Palace generally will be similar.

Internally the State entrance-hall will be lined with white marble and columns of pink granite from Italy. It is two stories in height, with tiers of arched, the rooms on the upper floor forming galleries all around it. It will be roofed by a dome of iron construction, the soffits being formed of teak ribs with richly coffered panels of plaster, all gilded with the dull Indian gold, as lighted from the top by an eye filled with stained glass.

The floors of entrance-hall and corridors are of marble. The fountains in the centre of the hall, zenana quadrangle, and courtyard to private entrance, will be of marble and bronze.

The furnishings internally will generally be of teak and plaster. The tower shown will contain a large tank for water supply and fire service.

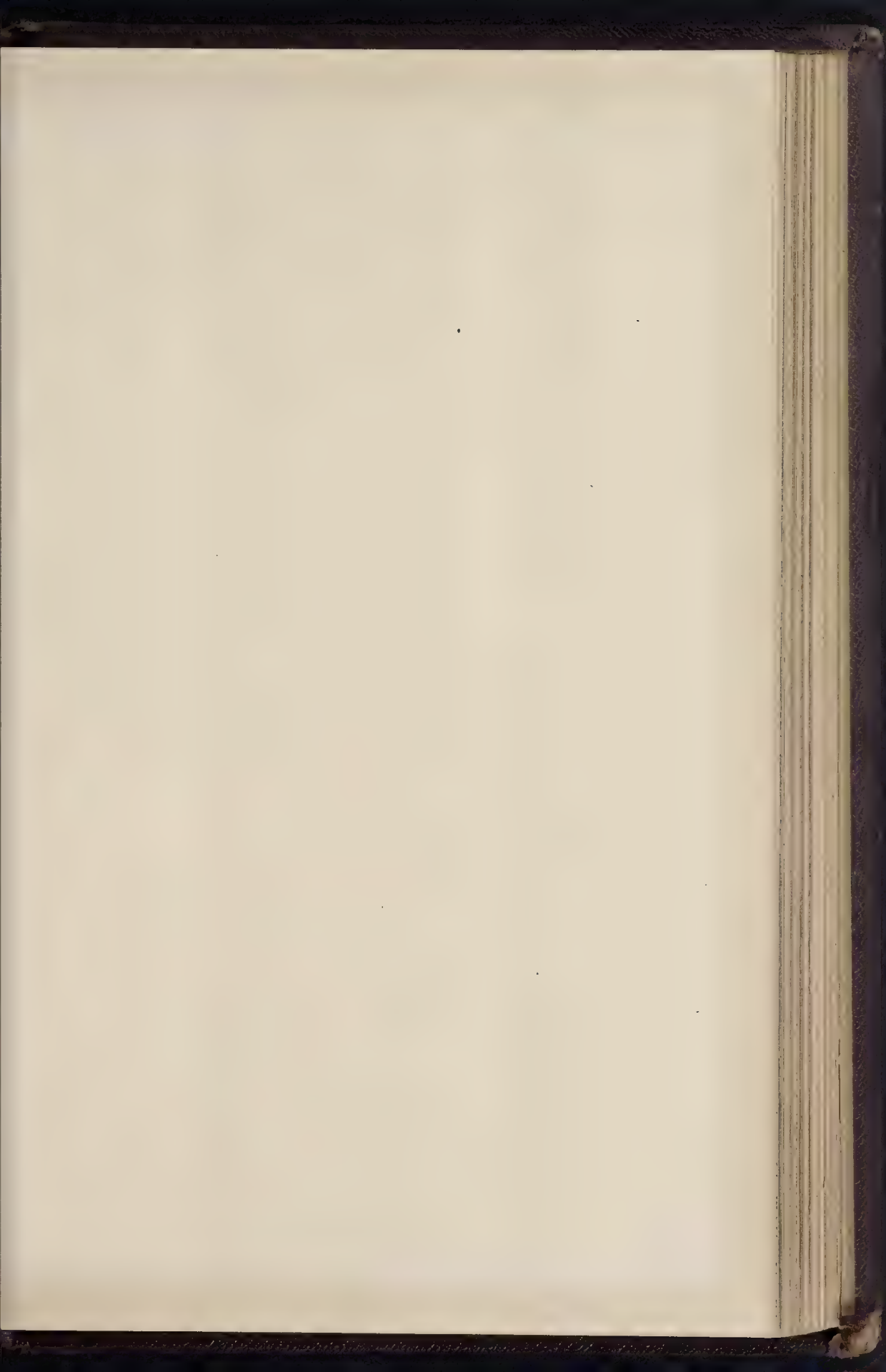
W. EMERSON.





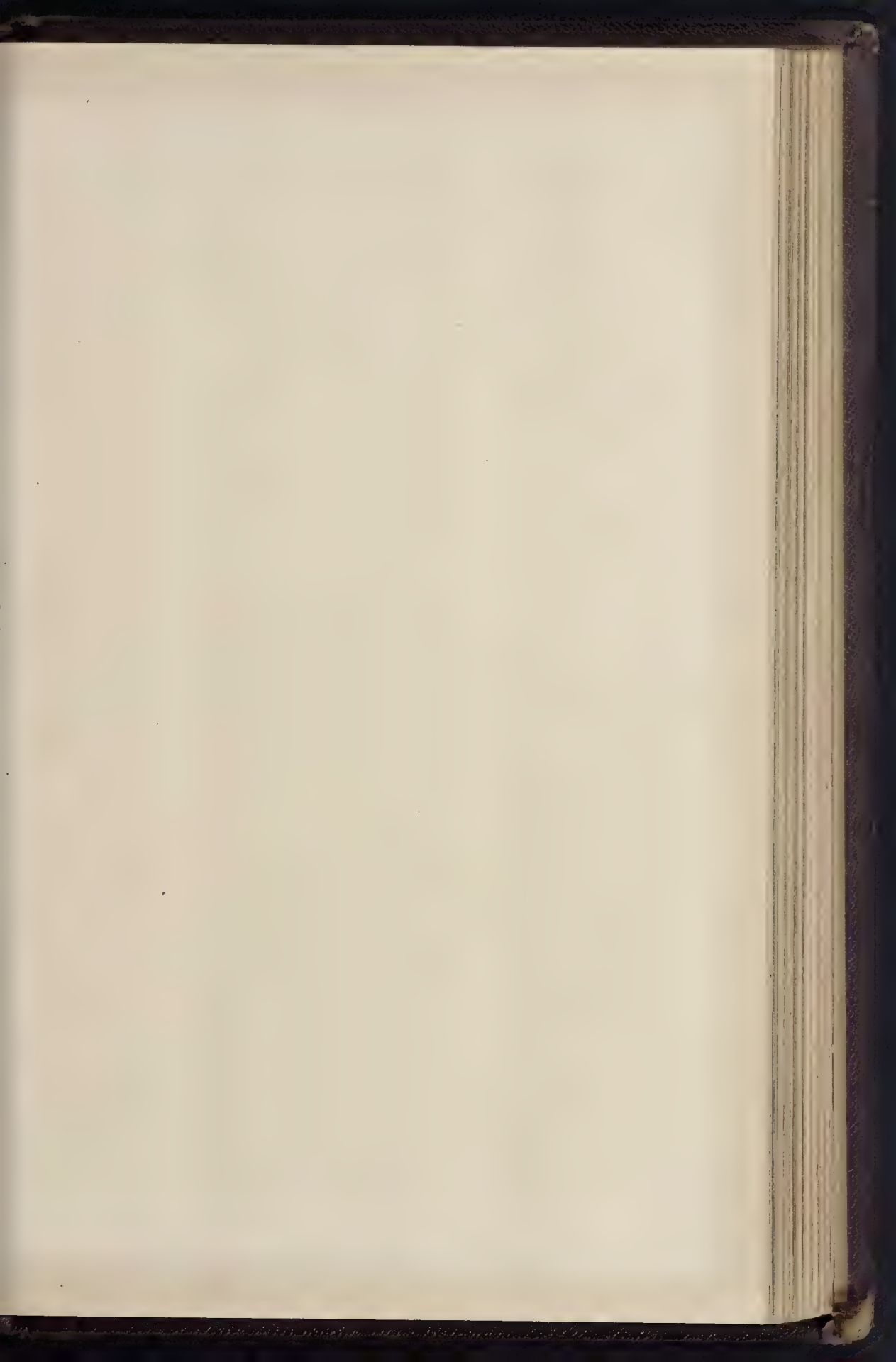


74 PHOTO SPAN AT A.C. B.S. 1895, HANGING STREET FETTER LANE E.

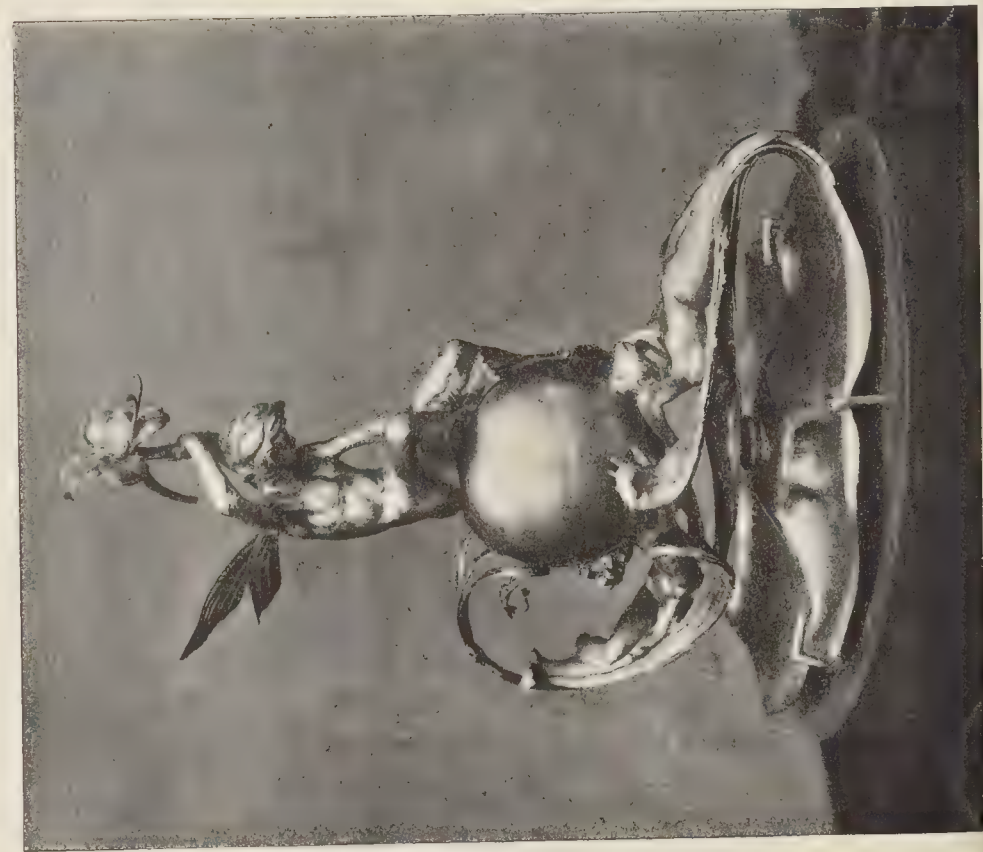


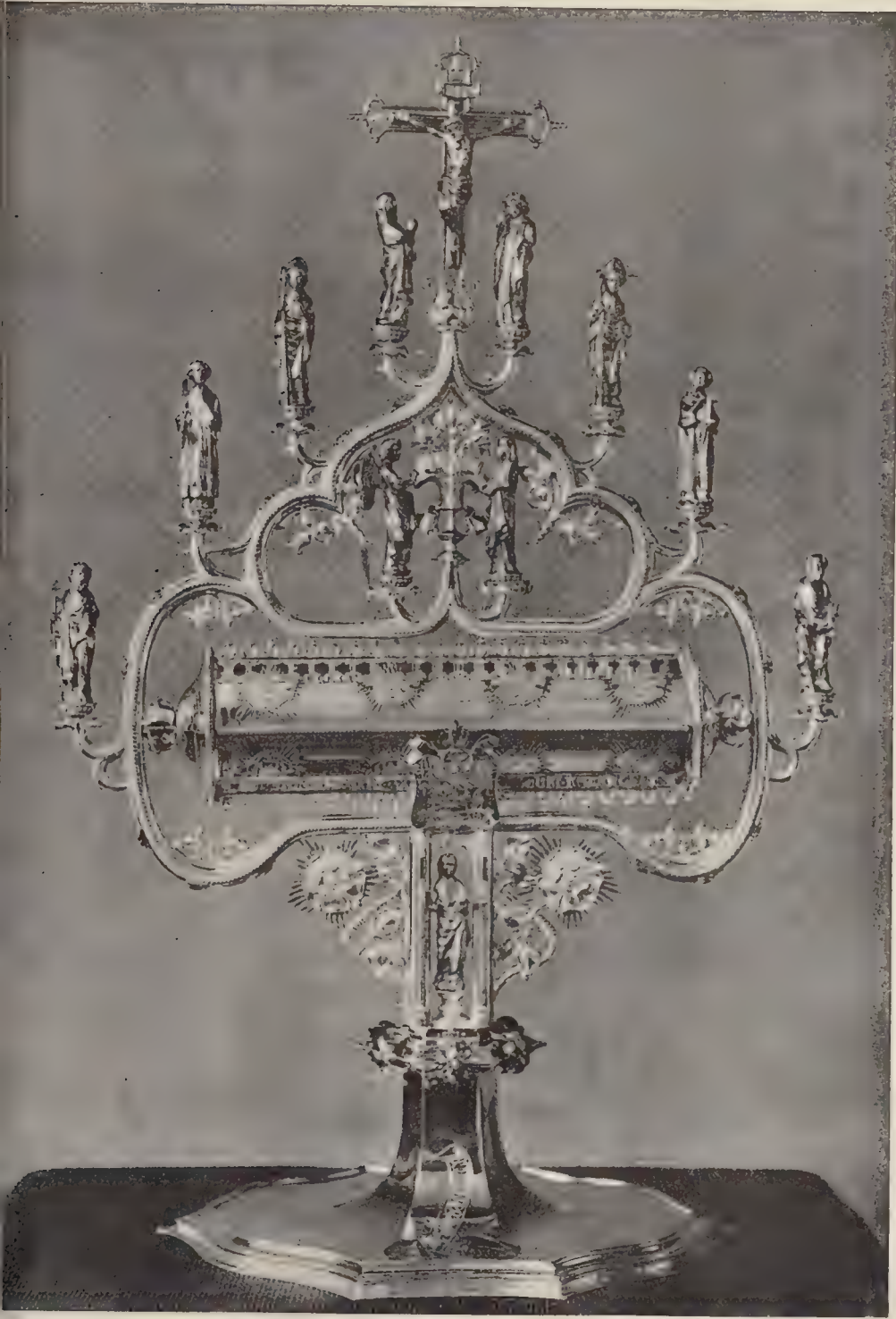
THE HOLLAND, MAY 11 1895





THE BUILDER MAY 11, 1895



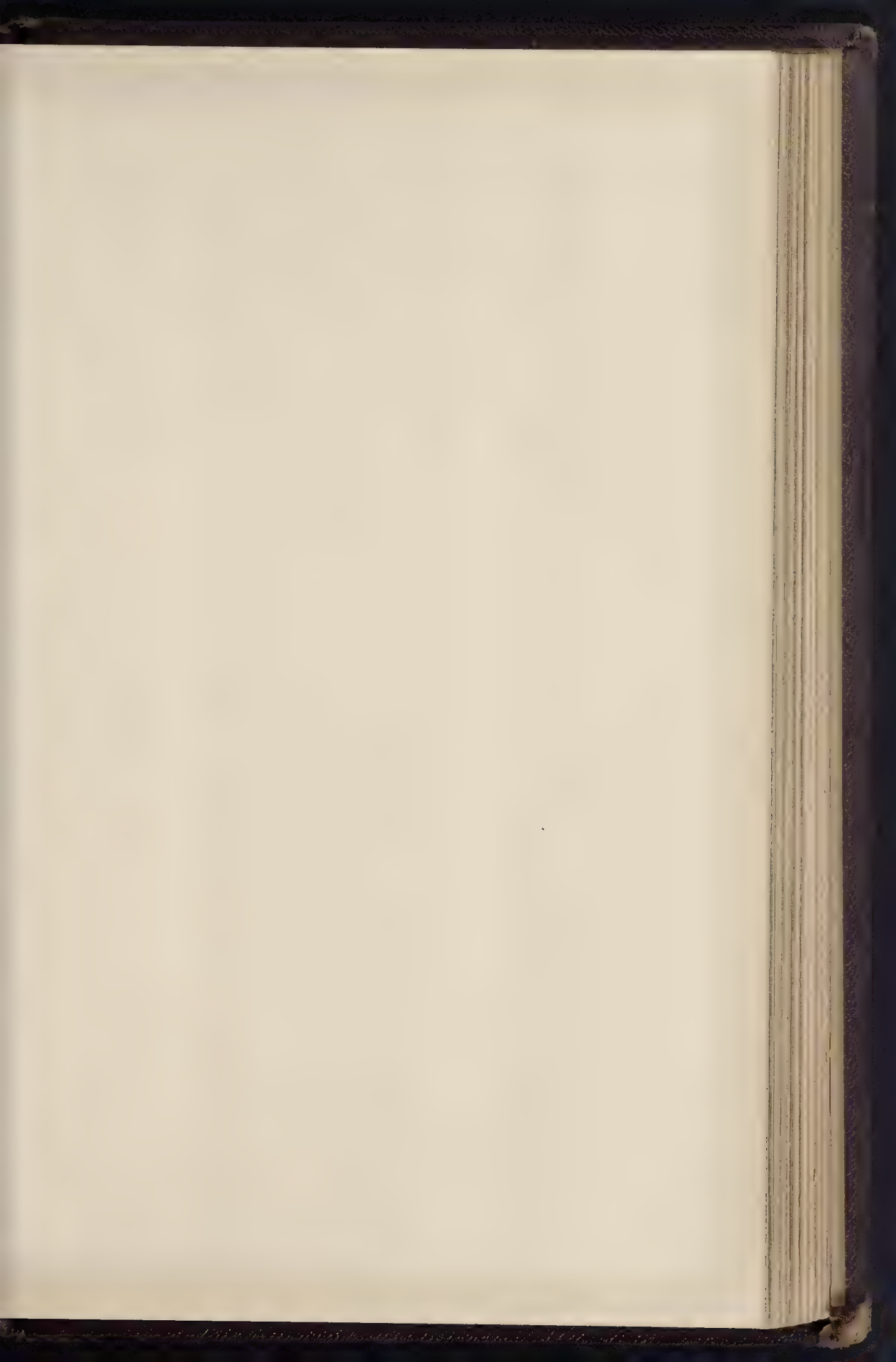


CASKET FOR ADDRESS PRESENTED TO EX-LORD MAYOR KNILL. DESIGNED BY MR J. F. BENTLEY, ARCHITECT

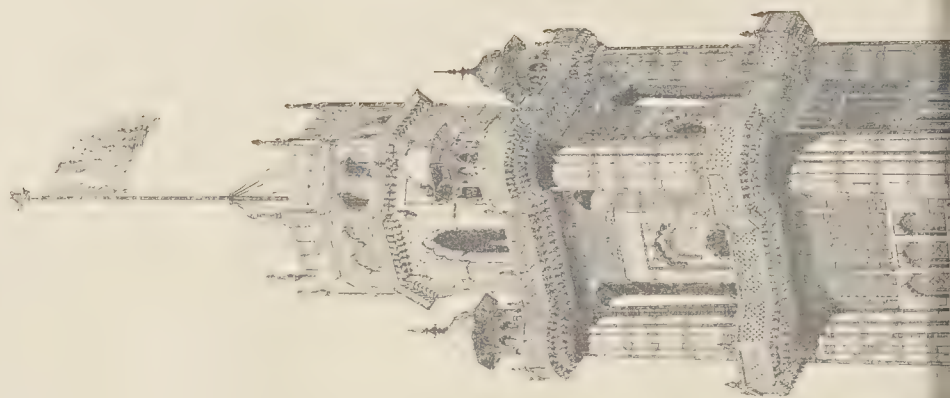


COLLEGE STUDIO AT NORTHWOOD. MS. J. NIXON HESSELTIN, ARCHT.

View from the north



THE PENNSYLVANIA STATE HOUSE

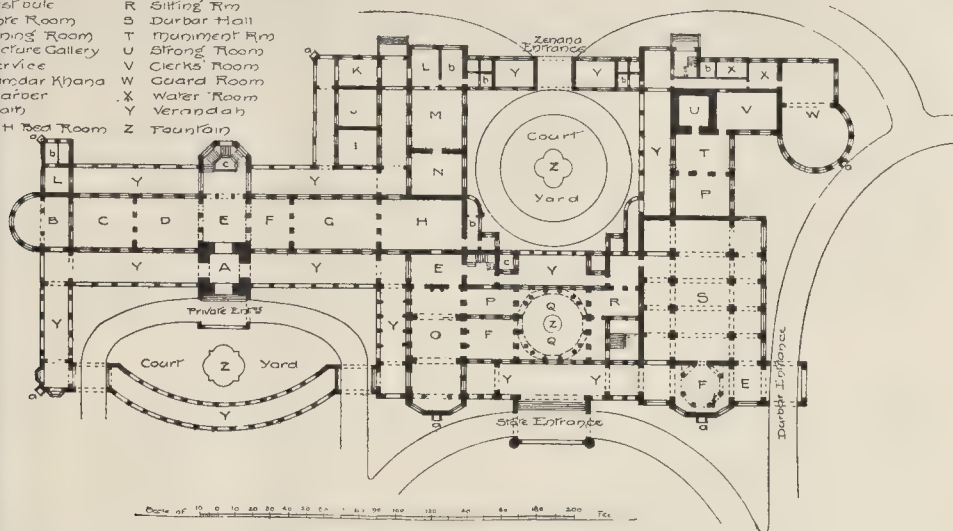




PALACE FOR HIS HIGHNESS THE MAHARAJAH OF BHOWNUGGER INDIA - MR. W. EMERSON, F.R.I.B.A., ARCHITECT

PRINTED BY THE ENGINEERING AND ARCHITECTURAL OFFICE, LONDON

Tower	N	H.H. Dressing Room	a Sentry Box
Smoking Veranda	O	Drawing Room	b W.C. over passage stairs, &c.
Smoking Room	P	H.H. Refining Room	c Lift
Billiard Room	Q	Hall	
Veranda	R	Sitting Rm	
Office Room	S	Dining Hall	
Dining Room	T	Trunking Rm	
Picture Gallery	U	Strong Room	
Service	V	Clerks' Room	
Jangdar Khana	W	Guard Room	
Barber	X	Water Room	
Bath	Y	Verandah	
H.H. Bed Room	Z	Taunton	



Ground Floor Plan, Palace for the Maharajah of Bhownagur.

A TOWN CHURCH.

On this design for a church, one or two features have been introduced which, perhaps, call for comment. The site being surrounded at the side back, the west front and interior have there more elaborate detail than the other portions. The nave, which is 50 ft. wide between the walls, is divided into five bays, 15 ft. centre to centre, the aisles either side have been made purely narrow, being intended for passageways. Over these aisles are small galleries running the whole length of the nave, and supported by arches springing from the main piers.

The organ is placed over a vaulted stone screen the entrance to the chancel. It is divided into five bays, the centre one having bronze gates. The main piers go the whole height of the church, have semicircular arches springing from them, and across the nave and along it. The height of this treatment would give, and the effect the long, narrow, 2-light windows in the clerestory walls above the galleries should help to in an imposing interior.

The chief feature of the west front is the large light window, which occupies the whole space between the two angle turrets. The materials intended to be employed are Portland stone, red bricks, and lead roofs.

The drawing was exhibited in last year's Royal Academy. SIDNEY K. GREENSLADE.

DESIGNS FOR ELECTRIC LIGHT BRACKETS.

THE opportunities which electric lighting affords for novelty in the artistic design of fittings, for the most part, have been made little use of, the illustrated catalogues of electric lighting show us find designs for ornamental burners, but these in general the less said the better—we are pleased, therefore, in publishing two designs for electric light brackets, modelled by Miss Esther Moore, which in the true sense are artist's work. The design, with the tray at the bottom, intended for a lamp for a writing-table, the for pens, &c. The ball could be charged would last twenty-four hours, but it could be connected underneath the lamp. This was exhibited in the Summer exhibition at New Gallery last year, and is now on view at Messrs. Bellman, Ivey, & Carter's, New Bond-street. The design for the bracket was exhibited at the last Arts and Crafts Exhibition. The design, or rather locust, is arranged so as to throw light downwards. It is modelled in wax, and not yet been reproduced in bronze.

A CASKET FOR A PRESENTATION ADDRESS.

THIS beautiful piece of work was made by Mr. Thos. Elsley, from the design of Mr. J. F. Bentley, the architect, to contain the address which was presented to Sir Stuart Knill about eighteen months ago by a number of Catholic friends on the occasion of his retirement from the office of Lord Mayor of London.

The fact that the address was especially a kind of demonstration on the part of co-religionists accounts no doubt for the very ecclesiastical turn given to the design, which, as we heard it remarked, suggests rather a reliquary than an address casket. That, however, is a matter of taste and sentiment with which we have no concern. It is a beautiful and original design in silversmith's work, and we may take the opportunity of pointing out the difference between this kind of production, the individual work of an artist, and the kind of "shop" design which is usually turned out for address caskets, and gets engraved in the *Illustrated News* or the *Graphic*, accompanied by the commendatory remarks of the press reporter. If those who are concerned in the presentation of ceremonial addresses and other things for which "caskets" are required, would do as Sir Stuart Knill's friends did—go to a man who is an artist and ask him to make a special design, instead of ordering a casket across the counter of a shop—we should more often have the chance of seeing, as in this case, a work which is a pleasure to look at and a credit to English art, instead of a piece of showy commonplace.

NEW PREMISES, TOTTENHAM COURT-ROAD.

THESE premises are the realisation of the endeavours of Elizabeth, the blind daughter of the late Bishop Gilbert, of Chichester, who, having lost her eyesight in childhood, devoted the rest of her life to the amelioration of the troubles of her fellow sufferers, by having them taught trades in which sight is not necessary, such as the manufacture of brushes, brooms, baskets, mats, rugs, mattresses, sash-line, wool-work, chair-caning, and firewood-chopping, &c.

In May, 1854, Miss Gilbert hired a cellar in New Turnstile, Holborn, at 1s. 6d. a week, where her benevolent work was commenced. This Institution ultimately developed into "The Association for Promoting the General Welfare of the Blind," with premises at 127, Euston-road.

In 1865 the Association removed to 210, Oxford-street, and thence to 28, Berners-street. Miss Gilbert died in February, 1885, leaving a large sum of money, partly her own means and partly collected by her, as the nucleus of a fund for providing permanent premises for the Association. In 1891 a building agreement was entered into with the Duke of Bedford for the present site in Tottenham Court-road, upon which the buildings were erected from the designs of Mr. C. Fitz-Roy Doll.

On the different floors workshops are provided for the manufacture of all the articles enumerated above, both for male and female operatives.

The elevations are faced with red bricks from the Heather Brick Company, the dressings being Ancaster stone, from the Lindley quarries. Messrs. Allen & Sons, of Kilburn, were the general contractors, and Mr. G. March acted as clerk of the works.

The cartoons for the sgraffito were drawn by Mr. S. Erat, Harrison, and the work was executed by Mr. C. H. Walton.

The drawing was exhibited at the Royal Academy last year.

COTTAGE STUDIO, NORTHWOOD.

THIS house stands on high ground close to the station, and enjoys fine views over the adjoining hills and the Ruislip Reservoir.

It was built to the special requirements of Enoch Ward, illustrator, in a particularly sound manner, with special mouldings throughout.

Externally, the walls up to the first floor are of red facings laid with a weathered joint, and the upper part is faced with cement, finished smooth, to receive a varied tinted surface.

The doorway and adjoining windows are of stone. The timber externally is of oak, left as from the saw, and pegged together, the roof being covered with Broseley tiles.

The studio is 26 ft. by 18 ft., with large plate-glass windows facing north, and angle-nook at one end. The floor of the studio is 18 in. below the ground-floor level, which contains two sitting-rooms, a square hall, with three bedrooms, bath, &c., over.

Above the studio and raised by four steps are two attics; thus the studio is 13 ft. high, whilst the smaller rooms are about 9 ft. high. There is space in the roof for four more bedrooms, and the joists and roof are prepared to receive the same if required. The architect was Mr. J. Nixon Horsfield, of Kingston-on-Thames.

INCORPORATED ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.

A HOME Counties' District meeting of this Association was held on Saturday last, at Brighton. The members attending the meeting were received by the Mayor, Alderman Botting, J.P., in the Royal Pavilion, that gentleman presiding during the first part of the proceedings. The members of the Association present included the President, Mr. A. M. Fowler, of Stockport; Messrs. Lewis Angell, West Ham; C. Jones, Ealing; C. Lowe, Hampstead; Weaver, Kensington; Walker, Croydon; Robson, Willesden; Lobley, Hanley; Mann, Sevenoaks; W. H. Savage, East Ham; C. Mason, Charing Cross; J. P. Norrington, Lambeth; W. N. Blair, St. Pancras; E. J. Lovegrove, Hornsey; J. P. Barber, Islington; W. Fairley, Richmond; P. C. Lockwood, Brighton; E. P. Hooley; and others.

The Mayor having welcomed the members to Brighton, the President took the chair, when Mr. Laffan, of Twickenham, was elected Hon. District Secretary of the Home Counties, in place of Mr. O. C. Robson, resigned, who was accorded a hearty vote of thanks for his past services.

Brighton and its Municipal Works.

Mr. F. J. C. May, Borough Engineer and Surveyor of Brighton, then read an interesting paper on "Brighton and its Municipal Works." The author gave a short summary of the history of the town, and then divided his paper into three parts, as follows:—Section I.—A description of the climate and geological features of the town, and a review of the improvements executed by the governing body of the town before its incorporation. Section II.—A description of the works carried out by the Town Council, from the date of the incorporation of the town in 1854 to 1888. (The author's predecessor, Mr. P. C. Lockwood, was Borough Surveyor during the greater part of the period—i.e., from 1858 to 1888.) Section III.—The works carried out by the Town Council from 1889 to 1895, the period during which the author had acted as Borough Engineer and Surveyor. In the first period much attention was given to groyning by Mr. Lockwood, the result being the reclamation of more than twenty-three acres from the sea, enabling the Corporation to increase the width of the carriage-ways and esplanades on the Front. The author also enumerated the improvements carried out on the Front during this period at a cost of nearly 75,000*l.*, exclusive of groynes and sea walls. The purchase and laying out of Preston Park, the erection of the Sanatorium, the overhauling of the drainage system, and the laying of the great intercepting sewer, 7½ miles in length, from the western boundary of Hove to the outfall at Portobello, at a cost of 104,608*l.*, and the purchase of the Waterworks in 1872 at a cost of 352,000*l.* were also alluded to, and this section of the paper closed with a description of the North-road Baths, opened in 1871 at a cost of 1,888*l.*, and twice enlarged at an expenditure of 4,034*l.* in 1874, and 575*l.* in 1885, and of the Park-street Baths, opened in 1888, at a cost of 5,544*l.* Coming to the description of works executed in or since 1889, the author described the Shelter Hall and terrace built on the Madeira-road in 1889-90 at a total cost of 14,029*l.*; the electricity-generating station in North-road, the purchase of "Queen's Park" by the Race Stand Trustees for 13,503*l.*, and the gift from them to the town, the recreation-ground in Southdown-road, presented by Alderman Blaker, and the acquisition of the Bird Museum in Dyke-road by bequest from the late Mr. E. Booth. The cottage baths in Brunswick-place and Cobden-road were also alluded to, and a detailed description given of the new swimming bath in barrack-yard. Allotments, condemned areas, the abattoir, the extensive sewage works in progress, the destructor in course of erection, and sea defences were all touched on, and the author mentioned as works in contemplation, in addition to sea defences, the municipal buildings improvement scheme, technical schools, alterations and extensions of the buildings on the Pavilion Estate, to form new Free Library and reading-rooms, museums, and picture and art galleries, and the new sanatorium.

At the close of Mr. May's paper, he was accorded a hearty vote of thanks on the motion of Mr. Lewis Angell.

The Brighton Electricity Supply.

Mr. Arthur Wright, Electrical Engineer and Manager of the Corporation Electricity Works, then read a paper, entitled, "Points of Interest in the Development of Electricity Supply at Brighton." He said that as far as he was able to determine, Brighton was the first town in

England:—(1.) To possess a central station erected for the express purpose of supplying the general public with electricity. (2.) In which the inhabitants had the opportunity of paying for the electricity they actually consumed. (3.) To have the advantage, or the reverse, of having had electricity supplied by more than four distinct systems of electric distribution during the last ten years. (4.) To have been the first town to adopt a differential system of charging for the electricity consumed, based on the actual cost of supplying it to each individual customer. (5.) In which electricity has been supplied from one central station, both by the continuous and alternating systems of distribution simultaneously. The author gave some points connected with the history of the development of the electricity supply in Brighton, mentioning that in 1893 the Corporation, recognising that the two-wire system could never be capable of supplying economically the whole of the borough from their one station, and the greater efficiency of the three-wire system, converted their entire system to the latter form. In the same year they carried out the electric lighting of the King's-road. In 1894 the Corporation extended the distributing mains in all directions of the borough, and put down a high-tension alternating plant for supplying the purely residential districts in the north of the town. It was in these districts that the system had been developed of supplying electricity at light loads by the continuous current, and at heavy loads through the medium of high-tension alternating feeders. The author exhibited two tables, which were based on the latest published results of most of the central electricity supply stations in the United Kingdom, which showed that in 1894 the actual cost, exclusive of redemption and interest, of supplying electricity from the Brighton Corporation station, was less than from any other central station in Great Britain, and that the sale of electricity per inhabitant, taking all the towns having more than 50,000 inhabitants, was greatest in Brighton. When it was recognised that at the end of this year the capital sunk in the Corporation Electricity Works would probably reach 160,000*l.*, that nearly a million units would be sold during the year, that most of the principal streets would be electrically lighted, and that the annual consumption of electricity per inhabitant would in all probability reach the high figure of eight units, it would be seen how rapidly the electricity undertaking was developing. The author next considered the two most distinctive features of the Brighton Corporation electricity supply, viz., the method of charging for electricity consumed, and the system of distributing it in the residential scattered districts. He said that "the total monthly expenditure depends much more on the maximum rate at which the generating plant has to supply electricity during any year, than on the actual amount of electricity that has been supplied. This fact he recognised in April, 1883, when, before meters were devised, he charged the consumers supplied by the old Hammond Company 6s. per arc lamp per week, and 1s. 6d. per carbon used; and after meters had been devised for the incandescent service, the charge was made at the rate of 1d. per lamp hour if the lamps were not used three hours per day, and a 3d. otherwise. The present method of charging for electricity consumed, adopted by the Brighton Corporation, is an improvement on the above system, but still based on the same principles. In 1895 the charge for electricity consumed by anyone in Brighton is reduced to 3d. per unit as soon as the proper proportion of cost of having to be ready to supply that individual has been paid for by the revenue derived from his previous consumption in the same half-year, being charged at 7d. per unit. This, in the year 1895, happens to be after the use of his greatest demand for one hour per day on the average. By means of this equitable tariff the Corporation are enabled to offer consumers who use their demand regularly four hours a day, electricity at 4d. per unit, although coal costs the Corporation over 20s. a ton. All electricity consumed in Brighton, whether it be by private individuals or by the Corporation for street lighting and other purposes, is charged on this basis. The cost of supplying electricity diminishes rapidly in Brighton according to the length of time the demand is used per day, and for street lighting (the demand being used in this case on the average nearly eleven hours per day, under which circumstances electricity can be supplied at 2d. per unit with a fair margin of profit), the time cannot be far distant when every street in the neighbourhood of the distributing mains will be electrically lighted, for there is no other suitable

form of artificial illumination which can compete with electricity at this price. . . . With regard to the last feature of interest in the Brighton system, viz., the use in the residential districts of low-tension continuous current at light loads, and of high-tension alternating currents at periods of heavy load, the author thinks much credit ought to be given to Mr. Ward Leonard, an American electrical engineer, who pointed out in 1892 that the obvious corollary from the well-recognised fact of the low-tension system being most efficient at light loads, and the high-tension system at heavy loads, must be that some combination of the two ought to give the greatest efficiency; and it was clear that, providing the details could be satisfactorily worked out as they have now been, it must necessarily be more economical and safer to run only the high-tension alternating system when the demand is heavy, and at all other times to supply the residential districts from the low-tension continuous-current system, than to continue to supply by means of alternating currents when the only reason for their use has ceased to exist, viz., big loads at big distances. . . . As meters are not procurable which will register equally accurately with alternating or continuous currents, there seems to the author to be no objection to the combined system; and when it is remembered how the periods of light load on the average last ten times as long as the periods of heavy load, must be clearly unnecessary to supply by means of the high-tension feeders and transformers, those parts of the town which can be so much more economically supplied by low tension through the ordinary distributing mains. . . .

The Brighton Water Supply.

Mr. James Johnston, Corporation Waterworks Engineer, then read a paper on "The Supply and Distribution of Water at Brighton." He explained how the water supply for the Brighton Corporation district was obtained by the intersection of fissures in the chalk by adits or headings driven from wells. The central wells were sunk to a depth equal to about mean sea level, and the adits were driven at that depth and in directions approximately parallel to the coastline, so as to cut the fissures at right-angles. These adits varied in size, ranging from 18 ft. high by 12 ft. wide to 7 ft. high by 6 ft. wide. Each had a grip cut along one side to convey the water to the pumps at the central wells, in order to keep the workings dry during progress. The roof was slightly arched, but this was not always necessary, as the chalk was so hard that frequently chisels and sledge-hammers were required to burst it, picks being of not the slightest use. At the Lewes-road Works—situated about 1½ mile from the shore—there are two pumping wells 93 ft. deep, connected by adits, and leading from these there are about 2,152 ft. of adits. The Goldstone Works, from which the main supply for many years has been taken, are about 2 miles west from the Lewes-road Works, and about 1½ mile from the sea. The fissures here differ greatly from those at the Lewes-road works. At the latter place they are more numerous, though smaller and individually less productive, whereas at Goldstone they are found at considerable intervals, and in some instances yield 1,500,000 gallons per day. The pumping wells are 168 ft. deep—connected as at Lewes-road—with 2,530 ft. of adits. The engines, like those at Lewes-road, are erected directly over the wells, which for convenience are elliptical in shape, measuring 12 ft. by 8 ft. across their longer and shorter axes respectively, the centres of the beams being over the centres of the wells. There are two deep-well pumps at the bottom of the wells, worked from either side of the centres of the beams. These pumps lift to the low service reservoirs adjoining the works, but there are also force pumps driven by the same engines, which take their suction from the deliveries of the deep-well pumps, and lift the water into the various higher reservoirs. The exhaust steam is condensed by jet condensers, and delivered into cooling ponds in the ground of the works. In connexion with the Goldstone Works are smiths', fitters' and turners' shops, in which the whole of the repairs for the various pumping stations are done, as well as all the jobbing engineers' work of the other Corporation departments. The Patcham pumping station is about 3 miles from the sea front, and on the western side of the London, Brighton, and South Coast Railway Co.'s main line to London. These works are at present in course of development, and there is one high-pressure compound surface-condensing engine, geared to drive two sets of three-throw deep-well pumps, which together are capable of

ing 1,500,000 gallons per day into the middle vice reservoir at Islingwood-road. The pump-wells is 175 ft. deep to the bottoms of the shafts, which at the present time are about 1,455 ft. in length. The engine is steamed from two Lancashire boilers working at 120 lbs. pressure. In order to keep the water supply well in advance of the somewhat abnormal increase in the population (due, no doubt, to the close proximity of the metropolis), the Corporation has authorised a further extension of the adits, and to extend a new well has been sunk adjacent to one now in use. There is also in course of construction for this station a very powerful indirect direct-acting three-cylinder triple-expansion surface-condensing engine of the marine type, working one set of three-throw pumps, each directly connected to one piston-rod, driving also two deep-well pumps by a connecting-rod from one end of the crank-shaft bell-cranks over the well. This engine is able to deliver 3,000,000 gallons per day into the highest service reservoir, the head, including friction in the mains, being ft. Two Lancashire boilers, for a working pressure of 120 lbs., are also on order to augment existing boiler power. At the Islingwood-road reservoir is one of Bailey's hydraulic motors, and by passing the necessary water from the service reservoir at Park-road into the motor, from which the motor takes its suction, difference in levels being 60 ft. This motor works either into the highest service reservoir at Race Hill or into the Warren reservoir to supply the Warren Farm Schools. The exhaust from the motor is delivered into the Islingwood-road reservoir, and thence into the service reservoir; the only expense, therefore, being that of pumping the extra water required into the Islingwood-road reservoir, together with the repairs, &c., to the motor. In consequence of the physical features of the country in which the waterworks are situated, the system of supply has been divided into five zones, or service districts, each supplied from separate reservoirs with its own set of mains. By this means the expense of pumping the water higher than necessary, as well as the pressure on the lead pipes and fittings, has been avoided. Ample pressure is thus provided for each zone, and in case of necessity the water can be let down from the highest to the lowest through a system of division valves, the pressure from the higher reservoirs being prevented entering the lower ones by self-acting valves in each reservoir. Four of the zones are each supplied from two reservoirs, the mains connecting them, the reservoirs being situated at the same level, but one on each side of the town. The Lewes Road and Goldstone Reservoirs pump into the reservoirs nearest them, the water levels balance themselves by gravitation, thus keeping an equal pressure throughout each zone. The zones are known as the Low, Middle, High, Higher, and Highest Service Systems. The total capacity of all the reservoirs is a little over 9,250,000 gallons, but are not intended so much for storage as for emergency purposes, the storage being naturally in the chalk from which the water is derived. These reservoirs are built of brickwork in cement, and formed in the chalk. They have not been used, but the insides are lined with two courses of tiles set in cement; they are covered in with arches 4½ in. thick, which spring from piers and brick arches, and from 12 to 18 in. of mould is in the covering arches. By this means the water is kept cool and pure, and the growth of vegetation which so quickly takes place in chalk when exposed to light and air is prevented. It, as has often been stated, from the time leaving the adits the water is not exposed to light until it is drawn from the taps by the consumers. The quantity of water supplied for purposes during the financial year ending 1894-5 has been 1,973,000,000 gallons. The population, estimated on the census returns of 1881, is over 150,000; but in the fashionable districts of Brighton, and on many other occasions, computed that there are in addition from 20,000 to 30,000 visitors. As Brighton is essentially a health resort, the waterworks committee have the fullest possible use to be made of the water-supply by the inhabitants, and the whole of the sewer-flushing and street-cleaning is done with fresh water. On the 1st of January 1884 of the Brighton, Hove, and Preston Waterworks Company—which was incorporated by an Act passed in the year 1834—by the Brighton, Hove, and Preston Constant Service Waterworks Company, it was found necessary to provide a duplicate set of mains in every street, so as

to comply with the statutory obligations to give constant service, the previous company's supply having been only intermittent. This was necessitated through the new company being unable to keep up the supply in consequence of the enormous waste of water caused by the old fittings in the houses. These old intermittent mains are now to a great extent done away with. The Corporation insists upon a constant supply being given to every new house, and the few remaining intermittent services are gradually being changed to the constant system. The intermittent mains have either been changed into constant (after the regulations have been complied with as regards house fittings), or taken up or cut off and left "dead" as they fall into disuse. For fire-extinguishing purposes fire-engines are quite unnecessary, as by working the division valves a pressure of water can always be given, and as much as 400 feet can be supplied in many parts of the district by this means. Fire hydrants are fixed at convenient distances in every street, and in some cases special mains have been laid for this purpose. The charge for water for domestic purposes is 9d. in the £ of the Poor Rate Assessment, and by meter in a sliding scale commencing at 1s. 3d. and ending at 7d. per 1,000 gals., in addition to a small rental for meter; a minimum charge, however, being made of 5s. for which 80,000 gals. are allowed. Water is supplied to the local authorities at 5d. per 1,000 gals.

At the close of the reading of this paper, votes of thanks were passed to Mr. Wright and Mr. Johnston, and the Conference then rose. Luncheon was provided in another part of the building, by Mr. T. Wilkinson, one of the firm of contractors carrying out the outfall works, who was accorded a hearty vote of thanks by the members and guests.

In the afternoon visits were made to the new Swimming Bath, in Barrack-yard; the Electricity Station, North-road; the Storm Water Outfall at the Norfolk Groyne; the Storm Water Outfall at the Albion Groyne; the Abattoir; the Destructor in course of erection; and the Preston-park. The gathering concluded with tea in the Pavilion, which was provided by the Borough Engineer, Mr. May.

THE SANITARY INSPECTORS' ASSOCIATION.

At the May meeting of this Association, held on the 4th inst., at Carpenters' Hall, a paper, illustrated by numerous diagrams, was read by Mr. J. Young (Battersea), on "The Dwelling-House from a Sanitary Point of View," a portion of the matter introduced being taken from the prize essay "On the Ventilation of Dwelling-Houses," which gained for the reader of the paper a "gold medal" five years ago. The author referred to the valuable by-laws made by the London County Council since the passing, in 1890, of the General Powers Act, these by-laws rendering it now unlawful to erect houses upon "made" sites until any deposited fecal, animal, or vegetable matter, dust, or other refuse had been excavated, removed, and replaced by a layer of good concrete at least 6 in. thick. Nor is it now lawful to build on any portion of a site which is below Trinity high-water mark, or which will not admit of being drained into existing sewers. Unfortunately, in many districts, these salutary regulations, through the neglect of the officers entrusted with carrying them into effect, remained a dead letter, whole streets of houses being still built by speculating house-builders, on land on which there was no trace of concrete.

Among the matters requiring attention, beyond those provided for by the Act and the by-laws, was the lowering of subsoil-water to at least 5 ft. below the ground or basement floor, for at certain seasons of the year there was the greatest reason to believe the rising of the subsoil water was a frequent cause of danger to the occupants of houses, particularly those in low-lying districts. Besides the salutary and indispensable concrete, it was important to insist on proper damp courses to prevent wet from rising up into the walls by capillary attraction. Inspectors should always remember that a dark house usually meant a badly-aired and a dirty house, and all dark staircases, corridors, and corners, or closets not lighted should be unhesitatingly condemned. With regard to "ventilation," the lecturer referred to the readily-opened sash window which would afford a ready means of "flushing rooms with fresh air" as one of the principal points to be exacted, and he described a simple arrangement by providing a deep lining or bead inside the lower

sash which secured that only one current of air should enter at the window, and that in an upward direction. Inlets for the admission of warmed air in connexion with Sir Douglas Galton's fire-grate were recommended. Rooms should also have air outlets as well as inlets, the former being near the ceilings, but they should be completely disconnected from smoke-flues. Specially constructed flues should be built alongside the smoke-flues, each room having its own separate outlet, and these flues should all be carried up to the same height above the roof, with a protecting-cap or cowl to prevent down draught. Water supply must be as closely looked after as the supply of pure air. Where, as in most parts of the metropolis, the supply was still intermittent, cisterns could not, unfortunately, be dispensed with, but they should never be of lead, but of glass, glazed stoneware, or slate, and care should be taken that no cistern employed to supply drinking-water should also be employed to supply water- or slop-closets. The pipes should, if possible, be of tin, or have tin-linings, but the evils resulting from the use of leaden pipes in some districts were not so great in districts supplied by the water of the Thames or the Lea, which did not appear to appreciably affect the lead-pipes, through which it passed more or less rapidly, as it did the cisterns with which the water remained much longer in contact. With respect to drainage, the lecturer thought there was great need for uniformity of action among sanitary inspectors. The modern drains put in by jerry-builders, were very different constructions from those great cloaca, some of which still existed in Rome after more than 2,500 years of good service. The lecturer entered, with considerable detail, into the construction, ventilation, and trapping of drains, the means of preventing the accumulation of sewer gas and its entry into the dwelling-house; and this portion of the paper concluded with a summary statement of the returns obtained from forty Metropolitan parishes respecting the provision of disconnecting-traps and inspection-chambers. Disconnecting-traps are insisted upon in connection with house-drains in Battersea, Bermondsey, Camberwell, Chelsea, Fulham, Hammersmith, Hampstead, Holborn, Islington, Kensington, Lambeth, Limehouse, Fiddington, Poplar, Rotherhithe, St. George's (Hanover-square), St. George's (East), and St. George's (Southwark), St. Giles, St. Luke's, St. Martin's-in-the-Fields, St. Marylebone, St. Mary (Newington), St. Pancras, St. Saviour's (Shoreditch), Strand, St. James's (Westminster), St. Margaret's, St. John's (Westminster), and Wandsworth. In Bethnal Green they are not demanded, and in Clerkenwell they are only compulsory in the case of new property. In Plumstead they are allowed in special cases, but are not required, while at Stoke Newington and one or two other parishes no definite decision has yet been arrived at by the authorities with regard to them. In Whitechapel they are required where possible, and in the majority of parishes where the disconnecting trap is insisted upon, inspection chambers are also required. It was satisfactory to find that in very few parishes were plunging shafts now allowed, which afforded, in the opinion of the lecturer, no adequate means of inspection in houses having no forecourt under which drains might pass. The practice with regard to the position of the trap was very varied. In some it may be in a vault or a cellar, in others it may be fixed under a public footway, while in Camberwell and Shoreditch it is introduced immediately at the back of the house. No replies to the questions were furnished by Greenwich, Hackney, Lewisham, Mile-End Old Town, St. Olave's, or Woolwich.

An animated discussion followed, a very cordial vote of thanks being accorded to the lecturer.

COMPETITIONS.

COUNTY BUILDINGS, DURHAM.—The Durham County Council has awarded the first premium in this competition to the authors of the design marked "Onward" (Messrs. Cooksey & Cox, 19, Craven-street, Charing Cross, W.C.), and the second premium to the authors of the design marked "Demos" (Messrs. Barnes & Coates, 41, Fawcett-street, Sunderland), subject to clause 29 of the instructions, which requires the successful competitor to obtain, at his own cost, a *bond fide* tender from some well-known contractor of good standing, and approved by the Committee, to carry out the work for the amount of his estimate.

BOARD SCHOOLS, ENFIELD.—The assessor in this competition, Mr. Macvicar Anderson, to whom the ten competitive designs for the

Chesterfield-road School, Enfield, were submitted, has placed first the plan sent in by Mr. G. E. T. Laurence, of Queen Victoria-street, that by Mr. Jones, of Harley Lodge, Bush Hill Park, being placed second. The Board have resolved, subject to the approval of the Education Department, to accept Mr. Laurence's design. The school will accommodate 1,194 children, in three departments, with an assembly hall for their joint use. Cookery and manual instruction rooms are also included in the scheme. Provision is made for a future infants' assembly hall.

COTTAGE HOME AND SCHOOLS, STVAL, CHESHIRE.—The award made in this competition by the Assessor, Mr. John Macvicar Anderson, was as follows:—First Premium, "A Home" to Messrs. Charles Clegg & Son, of 104, King-street, Manchester; Second, "Q.E.D.," Mr. J. W. Beaumont, of 10, St. James's-square, Manchester; Third, "Village Homes," Messrs. W. Telford Gunson & Sons, of 10, Marsden-street, Manchester. The Assessor in his report says that, so far as merit in design and adaptability is concerned, he has no hesitation in placing the plans of "Snowflake" first, but as, in these, accommodation is only shown for 286 children, instead of 300, he has in consequence reluctantly felt compelled to disqualify the same. The Guardians have, however, decided to adopt the plans of "Snowflake," whose author, Mr. J. B. Broadbent, of 1, Princess-street, Manchester, has been entrusted with the carrying out of the work.

CREWE SCHOOL OF ART AND WOMEN'S INSTITUTE.—The Technical Instruction Committee of the Borough of Crewe invited the following architects to send in competition designs for their new buildings, viz.:—Messrs. J. W. Beaumont, G. E. Balshaw, Chapman & Snape, Ford & Slater, J. Lane Fox, J. D. Mould, Jas. Stevens, Woodhouse & Tott, and Woodhouse & Willoughby. Messrs. W. Sugden & Son, F.R.I.B.A., Leek, were appointed assessors. They placed first the design numbered 7, and this decision has been accepted by the committee. When the sealed envelopes were opened, the author was found to be Mr. Jas. Stevens, F.R.I.B.A., 88, Mosley-street, Manchester.

BOARD SCHOOL, WILLESDEN.—The assessor in this competition, Mr. Macvicar Anderson, has awarded first place to Mr. G. E. T. Laurence, of Queen Victoria-street, and the School Board has accepted the design. The school is planned to accommodate 1,250 children on three floors, with a central hall on each floor. A cookery and laundry-centre is also provided.

ARCHITECTURAL SOCIETIES.

LIVERPOOL ARCHITECTURAL SOCIETY.—On the 6th inst., the annual meeting of the Liverpool Architectural Society was held in the Law Association Rooms, Mr. Henry Hartley, F.R.I.B.A., presiding. The annual report stated that the Society numbered 129 members, as compared with 130 at the close of the previous year. The committee expressed regret that the new school of architecture had not been so well attended as had been hoped at first. The receipts amounted to 110/ 15s., and there was a balance in hand, after meeting expenses, of 7/ 7s. Mr. A. B. Culshaw was elected President for the next session; Messrs. H. W. Keef and J. Woolfall, Vice-Presidents; Mr. J. W. Blakey, librarian; Mr. James Dod, treasurer; and Mr. Henry L. Beckwith, secretary. Mr. Hartley, in bringing the proceedings to a close, said that the most important event which had taken place during his period of office had been the establishing of a School of Architecture and Applied Arts, and the appointment of Professor Simpson to the Chair of Architecture of the University College. He congratulated the Society upon the fact that Liverpool was the first centre which had taken upon itself to establish such an educational work. He also congratulated the profession generally upon the accomplishment of a scheme which had been so long desired and so long looked forward to—namely the formation of such a school as a great centre from which would spring new life and greater vigour in the development of art by the systematic training which their younger members could now obtain. The school was dependent entirely upon the way it was supported and made use of by those for whom it had been specially created.

EDINBURGH ARCHITECTURAL ASSOCIATION.—A meeting of the Edinburgh Architectural Association was held on the 1st inst. in the Royal Institution, Mr. W. W. Robertson, President in the chair. Mr. John Burn read a paper on plumbing. In the discussion which followed,

the value to be attached to the use of safety-valves on kitchen boilers came in for a good deal of notice. Most of the speakers advocated the use of the safety-valve, but one speaker declared that he was invariably opposed to its use. It was, he said, a trap which led people into trouble, by the valve getting stiff and unworkable. The proper safety-valve was to have the pipes properly protected, so that there would be no risk of their being frozen. Some of the blame of the freezing of pipes was attached by certain of the speakers to the practice of having the pipes conducted through the house in chases which were mere ventilating shafts of cold air; but it was pointed out that a draught in the chase could be avoided by having the woodwork fitted close in to the pipes at each floor. There was a consensus of opinion that the cisterns should be so placed as to be accessible to the occupier of the house as to the plumber himself. Two or three of the practical plumbers remarked how the introduction of drawn lead traps had occasioned the loss of practice among plumbers in the working of lead, and was consequently a bar to the education of the apprentice. At the close of the discussion the Association, on the motion of the Chairman, seconded by Mr. H. J. Blanc, A.R.S.A., adopted a resolution declaring that the Association recognised the efforts of plumbers to increase the efficiency of their trade by educational and other influences, and viewed with approval a system of registration such as that adopted by the Society for National Registration of Plumbers, and by the Scottish Society for the Registration of Plumbers.

GLASGOW ARCHITECTURAL ASSOCIATION.—The Glasgow Architectural Association met on the 7th inst., Mr. Wm. Tait Conner, A.R.I.B.A., Vice-President, in the chair, when Mr. David B. Dobson read a paper on "Decorated Gothic." The essay was illustrated by lime-light, and at the close Mr. Dobson received the customary vote of thanks.

ENGINEERING SOCIETIES.

SOCIETY OF ENGINEERS.—At a meeting of the Society of Engineers, held at the Westminster Palace Hotel, Westminster, on the 6th inst., Mr. Wm. George Peirce, President, in the chair, a paper was read by Mr. Charles Mason, A.M. Inst. C.E., Surveyor to the Vestry of St. Martin-in-the-Fields, Westminster, on "Street Subways for Large Towns." The author, impressing the importance of an improved method of underground construction for the reception of the numerous mains laid beneath the streets, stated that the subject was one requiring the immediate and serious consideration of all engineers to public authorities, gas, water, electric light, and other companies. Further, the difficulties experienced in making periodical examinations of the mains as to leakages and repairs (as the recent explosions in the metropolis prove) has imposed a duty upon those having the control of the streets to devise some better means whereby the safety of the public is absolutely secured, and the life and cleanliness of the pavements materially benefited. The present system of leaving disused pipes beneath the streets was strongly condemned, as materially adding to the risks to those using the streets by reason of probable accumulations of gas therein. The author, in explaining the construction and uses of existing subways both in the provinces and the Metropolis, pointed out the chief difficulties in the way of their general adoption as being the question of light and ventilation, and cost of construction; also, in his opinion, the "single" system was open to objection, as the mains having to be placed on one side of the subway, compel the supply-pipes to be taken across the same for supplying premises on the opposite side of the street, thus blocking the passage-way and causing obstructions in the flow of the pipes themselves; the difficulties of sewer ventilation were also referred to. The author proposed "triple" subways having a central avenue for trunk mains, and side avenues for subsidiary or service pipes, vaults being provided beneath the footways remaining the property of the Public Authority and leased to the adjoining owner, thus providing some return for the outlay. A detailed description of the method of construction was given, with an estimate of the cost showing a profit based mainly upon returns of the rentals derived from the vault construction and charges for those using the subway; the saving which would accrue in keeping the streets free from obstruction unfortunately could not be reduced to figures on the credit side, although the saving to life and rolling-stock would be very great; immunity from frozen pipes due to an uniform

temperature in the subways was instanced as an argument in favour of subways. The author in conclusion strongly urged the desirability of obtaining powers whereby the whole of the subsoil of the streets should remain the property of the Authority, and although not directly advocating the municipalisation of all gas, water, and other companies, expressed the opinion that such a course from a municipal point of view would cause far less inconvenience than now arises to the public using the streets. Finally the subject was one of a very controversial nature, but in spite of all obstacles some form of the triple subway should be adopted universally in all large towns.

THE INSTITUTION OF JUNIOR ENGINEERS.—At a meeting of this Institution, held at the Westminster Palace Hotel, London, on the 30th inst., the Chairman, Mr. H. J. Young, presiding, a Paper on "The Warning of Buildings by Hot Water" was read by Mr. Ernest King, Wh. Eng., and Mr. Kenneth Gray. The subject was treated in two divisions, the first dealing with the low pressure system, and the other with that of the high-pressure. The authors having stated the theory of circulation and mode of determining the motive force in a hot-water apparatus, proceeded to deduce therefrom the best arrangement of the mains and pipes. The extent and size of piping to maintain suitable uniform temperatures in various buildings were then considered, and different forms of boilers reviewed, their particular advantages being fully discussed. It was shown to be an matter of economy to employ a boiler somewhat larger than actually necessary. The several parts of the apparatus were described in detail, attention being called to the important improvement in hot-water engineering by the introduction of the ornamental radiator used for ventilating as well as for heating purposes. Referring to valves, those with full waterway were specially advocated. Passing on to the high pressure system, its leading characteristics were brought forward, special mention being made of the pipe-joints, boiler-coil and pipes, and the various ways of circulation. The relative merits of the low and high pressure systems were investigated, from which it appeared that the former was more advantageous, being considerably cheaper, safer, more economical to work, and capable of readier and more effectual control. The paper was illustrated by a very large number of diagrams, specimens, &c., and an interesting discussion followed, in which Messrs. E. Berry, H. Parsons, W. King, F.R.I.B.A., P. Griffiths, Loftus Perkins, W. B. Clarke, W. G. Walker, Shephard, and B. T. King took part. A visit will be made, on the 18th inst., to the Imperial Institute, to inspect its heating system and other engineering features.

CIVIL AND MECHANICAL ENGINEERS' SOCIETY.—A paper was read before the Civil and Mechanical Engineers' Society, at its ordinary meeting on the 2nd inst., on "The Construction of Railway Bridges under 100 feet span," by Mr. Walter Beer, C.E. The author advocated the working out of a set of standard girders for spans starting from 15 ft. to the limit previously mentioned, advancing by increments of 5 ft., as he believed that the present weight of locomotive and rolling-stock had reached the extreme limit. He entered into the methods of calculating the strength of the various parts of girders; drew attention to the necessity for care in the arrangement of the parts, so as not only to give ample strength to them, but to allow of the easy construction, and of accessibility to all the parts for the purpose of painting. The author also gave examples and particulars of the construction of girders as well as of the main, and pointed out the necessity of properly bedding the girders on their abutments, and the effect of placing the girders at an angle, with the plates on which they rested. A good discussion followed the paper, among those who took part therein were the following:—Messrs. C. T. Walrond, A.M.I.C.E.; A. V. Ackermann, A.M.I.C.E.; E. H. G. Brewster, A.M.I.C.E.; M.I.M.E.; W. Cooper Peck, A.M.I.M.E.; J. Neslor Cooper, II. Williams, John W. Kitchen, Harold Cooper, and A. Barnham.

THE LONDON CHURCHES OF THE GOTHIC REVIVAL.

The following is a brief résumé of the lecture paper read by Mr. Thos. Fris. Bumpus on Monday, April 29, before the Tynbee Architectural Society. Love for old painted art (remarked the lecturer at the outset) never died out in England, and is attested by the absurdities of Strawberry Hill

and several "Gothic" churches erected here and here in England during that era of Classicism, the eighteenth century; while the *Contemporary Magazine*—about the only periodical of the time in which the arts were represented—did not a little towards keeping alive the flame of Gothic architecture, which for so long a period since its almost total extinction in the seventeenth century had feebly flickered. Towards this the writings of Milner, Carter, and Warton at the close of the last century greatly contributed, aided, when the present one was in its "teens" and "twenties," by the costly and magnificent productions of the Elder Pugin, Britton, and Le Keux, Wild, Coney, Cotman, and Dawson Turner. But all these, remarked Mr. Bumpus, did but little toward the improvement of our church architecture, which was as bad as it could be.

Allusion was made to the large number of churches built in London between 1820 and 1830 under the Commissioners by the architects of the day—Barry, Savage and Villiamy, Smirke, Beddall, and the Inwoods. In spite of poor and faulty details, several of the Gothic churches built at this time had much of special mention—the vaulted church of St. Luke, Chelsea, by Savage; and three at Islington, St. Paul, Holy Trinity, and St. John, by Barry.

In 1838-39, the Cambridge Camden and Oxford Architectural Societies were formed, and such practical good flowed from both these, as well as from the writings on architectural subjects by Brandon, Parker, Petit, Pugin, Rickman, Sharpe, and others. The London churches built between 1835 and 1845 were very poor; indeed, the lecturer remarked, a sort of pseudo-Romanesque—a German type—threatened to become the religious architecture of England, with Blore and Railton for its chief exponents. Shaw's Byzantine Romanesque church of Christ Church, "Ainsley-street," was cited as the most respectable in its class, indeed—the arrangement of the nave elevation was remarkably good; while Scole's church of St. John, Duncan-terrace, Islington, deserved a visit on account of Armitage's fine frescoes.

Hakewill, Ferrey, Cundy, Poynter, and Salvin left a good many churches during the early forties," but none approached Scott's St. Giles', Camberwell, in point of architectural completeness and purity of detail. During this period (i.e. 1845 to 1855)—the majority of the London churches were copies of ancient examples, Mr. Bumpus instancing, and in some cases briefly describing—St. Andrew, Well-street; St. John, South Hackney; St. Matthew, Ley-road; St. Barnabas, Pinlicko; St. Stephen, Westminster, and The Holy Trinity, Bessboro' Gardens. St. Mary Magdalene, Munster-square, is cited as a typical modern town church, in which the clearstory is absent. Butterfield, Carpenter, Pearson, Street, were all now rising to note, and Brandon had built, in imitation of Yorkshire abbey, the fine apostolic church of St. John's-square.

As examples of churches built in London under a second or inventive phase of the movement Mr. Bumpus instanced the stately and abnormal building by Mr. Butterfield—St. Matthias, Stoke Newington; All Saints', Margaret-street; St. Alban's, Holborn; and St. Augustine, Queen's Gate. Mr. Bumpus descended enthusiastically on the severe gabled tower of St. Alban's; on the imposing spaciousness of St. Alban's; on St. Augustine, Queen's Gate, whose quadrangular belfry was suggestive of one of those in Toulouse; and upon the gorgeousness of All Saints'. The difference in feeling between the frescoes by Dyce at All Saints', those on water-glass at St. Alban's, by Strang and Preedy, was pointed out, the latter remarking that a very happy medium struck between the naturalism of the former and the archaism of the latter by Mr. Holiday's work on the chancel wall of All Saints', Notting-ham, a noble building by Mr. White.

The introduction of a foreign element into our ecclesiastical architecture about 1855 was due, Mr. Bumpus opined, to the writings of Ruskin, Lillie competition, and to the increased facilities for foreign travel.

Scott's Churches of St. Mary, Stoke Newington, St. Andrew, Westminster; Street's St. James, Upper Garden-street; and St. Peter's, Khalil, by Mr. Pearson, were dwelt upon as remarkable instances of how our church architecture was for a time influenced by foreign forms. Mr. Bumpus thought no finer specimens existed than those built between 1865 and 1870 in Shoreditch, Haggerston, and Hoxton by Mr. James Brooks. In all

these a foreign tinge was discernible. Burges' St. Faith, Stoke Newington, was much praised. It was gratifying, resumed the lecturer, to remark that many of the architects who had shown a preference for foreign detail had within the last twenty years returned to more strictly English forms. Mr. Pearson's churches, in which the sublime in architecture had been reached—St. Augustine, Kilburn, St. John, Holborn, St. Michael, Croydon, and St. John, Norwood—were striking examples of this, in the purest Early English. Similar to these was St. Philip, Stepney, due to the late lamented Mr. Cawston. Street's St. John Divine, Kennington, and Scott's parish church of Kensington were fine Early Middle Pointed types of revived Gothic; while in St. Agnes, Kennington, St. Michael, Camden Town, St. Mary of Eton, at Hackney, and St. Barnabas, Dulwich, the Late Decorated and Perpendicular styles had been most ably resuscitated at the hands of Messrs. G. G. Scott, jun., Bodley & Garner, and Leeson & Oliver.

Much interest was centred in a fine collection of photographs of English, French, and German cathedrals and churches, Wild's fine series of French cathedrals, belonging to the lecturer, and other suitable items of interest.

TRADE CIRCULARS.

MESSRS. WYLIE & LOCHHEAD send us a book of designs for stencilled friezes and fittings, by Mr. Arthur Gwatkin. The quality of Mr. Gwatkin's design will be known to our readers by the work which he has exhibited at the Royal Academy, and which has been illustrated in our lithograph plates from time to time. The designs in this book present the same general characteristics; a bold and free flow of line with a sufficient conventionalism in the treatment of motives derived from natural foliage. The "Seaweed Frieze" and the "Cactus Frieze" are both exceedingly good; the "Genoa Frieze," a very bold treatment of floral forms in crimson tones, with open spaces of white ground between the scrolls, is still better. We can recommend these designs to the attention of architects.—Chatwood's Safe and Lock Company send us a new catalogue of their safes, in which the top, bottom, and sides are all bent solid out of a single steel plate; the edges at the back are also bent in solid to form flanges to take the back plate, which is fixed from within the safe, before the doors are fixed, and rivetted to the flanges with steel rivets clenched by hydraulic riveters. Exterior angle junctions are thus entirely got rid of.—Messrs. John Birch & Co. send us their illustrated catalogue of moulded bricks, brick and tile stamps, and brick-making machines. Among the latter is one (No. 4) introduced to supply a cheap brick-moulding machine for plastic and other clays. It comprises a mixer, pug mill, and circular rotary moulding-table, and being strongly mounted on a cast-iron base-plate, requires little foundation. It is offered as specially useful to contractors, and is capable of producing 10,000 bricks per day of ten hours.—The "Universal Sewage and Water Purification Co." issue a circular illustrating their method of screening and precipitating sewage, which is passed into a circular precipitating-chamber at a tangent to the outer wall, and is supposed to eddy round and come into contact with baffle-plates, which break up the solids; the sewage then escapes by gravitation into the chemical-tank and thence into the precipitating-tank. We should feel some doubt as to the mere impinging of the circular current of sewage against the baffle-plates doing all that is expected in the way of breaking up the solids; otherwise, the system seems calculated to work itself out all right.—Mr. G. Straus sends us two catalogues of apparatus and accessories for telegraphs, telephones, and lightning conductors, which contain illustrations of every kind of electric apparatus for house-furnishing, and serve to remind one to how many uses electricity is or may now be put for things of every-day use, including such things as bath-room electric pulls, pulls for signalling the opening of doors and windows, microphone table-stations, &c. The strong-sounding outdoor bell, placed on a bracket from the wall and with the battery covered in the top of the bell, is arranged with a double clapper so as to give a very powerful ring with a very small battery, which is protected from the weather by the bell itself acting as a cover to it.—Messrs. Farrar & Co., casement-makers and art-metal workers, send their catalogue showing a

great many sections of metal casements, both for inward and outward opening; also they show a double casement without a centre mullion, the two leaves meeting against each other. It is a great advantage, no doubt, to get rid of the centre mullion when the sashes are opened, but we should have liked to have seen the section of the meeting bars of the double casements, which does not appear to be shown.—Messrs. F. W. Potter & Co. send us a specimen of their "steel-lead" stair-tread, which appears to consist of a lead sheet with cross steel wires imbedded in it, with a mesh of about 1 of an inch square. We have had no means of testing its efficacy, but it appears as if it ought to make a good material for a tread.—Messrs. Debenham & Freebody send an illustrated catalogue of antique furniture, mostly English eighteenth century, at present on sale at their rooms. The illustrations show some interesting examples.—Messrs. Baird Thompson & Co. send us a large and fully-illustrated catalogue of their various heating and ventilating appliances, of which the most special are water-spray methods of inducing ventilation, and the invisible automatic roof ventilator; the catalogue also includes various inner ventilators of the usual kind, besides heating apparatus, fans, motors, &c.

Correspondence.

To the Editor of THE BUILDER.

THE RECENT SALE OF BLOCKS.

SIR,—Adverting to Mr. Bewick Ward's letter (p. 336 ante), I beg to say I wrote the "Note" (p. 310 ante) knowing the scope of the sale, which did not cover all the blocks cut by the Bewicks. They were the "pot-boilers," in that word's higher sense, as they laboured for their living. In view of previous sales of the Jupp and Hugh collections, for instance, with those by June Bewick and after her death, the term "the Bewick blocks" has not the exclusive meaning your correspondent seeks to give it, in depreciation of the excellence of Mr. E. Pearson's Bewick collection. Moreover, what he calls "the few blocks engraved by the Bewicks and sold last week" far exceeded in number those owned by Mr. Bewick Ward's family.

THE WRITER OF THE "NOTE" ON THE BEWICK BLOCKS.

The Student's Column.

BRICKS AND TERRA-COTTA.—XIX.
STRENGTH (continued).

VERY little is known concerning the transverse strength of bricks. The most complete account with which we are acquainted was given* in our columns many years ago, to which the student is referred. In summarising the results arrived at, we note that on comparing the strength of thin bricks and tiles (all those the thickness of which does not exceed 2½ in.) with the strength of the thicker bricks, that the former much exceeded the latter. For instance, in the thirty-five kinds of the thicker bricks tested, the average of the strongest was 2,835 lbs., the average of the mean strength 2,125 lbs., and that of the least strength 1,557 lbs.; the thickness varying from 3.25 in. to 1.7 in.; whilst from nine thinner kinds of bricks, none of them exceeding 2.25 in. in thickness, the results obtained were 4,088 lbs., 2,954 lbs., and 2,070 lbs. as the greatest mean and least strengths, giving an excess of strength, over the average of the whole, of 1,233 lbs., 829 lbs., and 513 lbs. These experiments were made on the assumption that if the transverse strength of the bricks was known, and if the mortar, after being allowed to set thoroughly, could be taken to be the same strength as the bricks, a calculation could be satisfactorily made as to the sustaining power of brick beams or lintels.

From what we now know, however, it would be rash to assert that the transverse strength of a brick is such an important factor in estimating its use in the connexion indicated. The weakness lies in the material with which the bricks are cemented together. It is true that in the experiments by Mr. Barlow on the transverse strength of brick pillars tested horizontally, the fracture was not through the joints, but through the solid bricks, but that must be regarded as the exception rather than the rule. It seems to be forgotten that although the bricks may be strong,

* The Builder, 1861, p. 50.

and the cement strong also—stronger than the bricks if need be—that there yet remains an important item for consideration, viz., the power of adhesion (in the broad sense) between the bricks and cement, in practice. Very strong bricks are frequently but little absorbent, although no rule can be laid down as to that; their surfaces may be fairly smooth, and not present sufficient unevenness to permit the cement or mortar to adhere or to interpenetrate, with any degree of firmness. So it is, that with the use of the most durable brick and the best cement, or mortar, we may not be able to construct the strongest wall; in fact, with a comparatively soft brick, but with very good mortar, a stronger structure could be erected.

Some observers have remarked, that in order to induce bricks to "take" the mortar, there should be a coating of rough sand on the outside of the less absorbent kinds, i.e. the moulding sand should be left to be fused to the brick in burning. We do not say that this could not be done in some instances, but there would always be a suspicion attaching to this process that the brick was not properly burned. Of course, we are alluding now to the more vitrified and hard-faced bricks. If these are to be thoroughly burned, the moulding sand would have to submit to fusion, or agglutination, as much as any other ingredient in the brick, when it would inevitably succumb to the process. Partially burned bricks and those not "hard burned" are in general porous enough to take the cement.

The value of tests of the transverse strength of bricks, therefore, is not of much use in theoretically estimating the strength of brick beams and the like; but it is, in a measure, an index of the general quality of individual kinds of bricks. If a good average transverse strength is attained, the brick is either made of good materials; or, if of bad materials, the burning has been good.

Strength of Brickwork.

So little is known concerning the strength of brickwork as deduced from actual experiment, that any information on the matter possesses considerable interest. The strength in all cases, bearing in mind what we have already remarked, is largely dependent on the nature of the cementing material, and no account is perfect unless both this and the bricks concerned are separately tested, and their degree of adhesion ascertained prior to their being built into the experimental block, pillar, or short wall to be subjected to stress. Further, all materials used in its construction should be minutely described; and the time allowed to elapse between the erection and the date of testing clearly stated. These important factors are often neglected.

The resistance of brickwork in cement to crushing power is generally stated at 232 tons per square inch, but that is a low figure, as we shall see. In estimating this the strength of a stock brick has been placed at 1'044 ton, and Staffordshire blue at 3'100 tons; the student is requested to compare these figures with those given in our last article. The weight of bricks is permitted to stand at something like 100 lbs. per cubic foot on the average; so that a column 7 in. square will thus weigh 7 lb. From this it may be said that a brick column might be erected to the height of 740 ft. of ordinary bricks, and much higher of better class material, without danger of crushing.

In the year 1887 Sir Arthur Blomfield had some experiments on the strength of composite columns of brick and cement carried out for him. Rough-cut Leicester bricks frogged on both sides were used for the purpose, and the average strength of each as ascertained by tests on six of them, was 150'6 tons per square foot, or 2,342 lbs. per square inch. The concrete used was composed of 3 parts gravel to 1 part of cement, and was made about four months before being submitted to the test; the results on four 12-in. cubes showed a tolerably uniform crushing weight of 121'5 tons per square foot, or 1,890 lbs. per square inch. These two materials—the rough-cut Leicester bricks and the concrete—were then put together as follows: Shafts, 3 ft. in length and 2 ft. in diameter, were constructed of the bricks, and the core was filled with the concrete. After being made four months, it was ascertained that they were capable of resisting the greatest pressure that the machine used could be brought to bear upon them, without being crushed. The only apparent injury was to the outer casing of bricks, and these latter being frogged, no doubt facilitated their partial destruction. The figures relating to tests carried out on two of these composite columns were:—

Approximate area of concrete 176 square in.
" " " " brickwork = 276 "

Brick and concrete column, 12 courses, 36 in. high, 24 in. diameter, 452 square in. area.

1. Results on 1st column: cracked slightly with 505,000 lbs. = 225'4 tons; cracked generally, 626,560 lbs. = 279'7 tons. Per square inch of area, 1,386 lbs.

2. Results on 2nd column: Cracked slightly with 522,000 lbs. = 233'0 tons; cracked generally 635,000 lbs. = 283'5 tons. Per square inch of area, 1,404 lbs.

It was unfortunate that the experiments could not be conducted to the crushing point, but there is sufficient evidence that piers made in the manner described, even with frogged bricks and under rather adverse circumstances, were capable of sustaining practically any weight that might be brought on them in practice. No doubt, if the piers had been permitted to stand a longer time than four months, seeing that Portland cement concrete continues to increase in strength beyond that time, the figures would have been still higher.

The following results as to the strength of brick piers were published in our columns many years ago.* Two brick piers, each 9 in. square on plan, and 2 ft. 3 in. high, were constructed of good, sound, Cowley stocks, set in cement of good quality. One pier was built with the bricks laid flat, and the other with them on edge. Two days after being made they were tested, when it was shown that the pier having the bricks laid flat compressed $\frac{1}{2}$ in., then cracked under a weight of 25 tons, and broke to pieces with a weight of 30 tons. The other pier, with the bricks on edge, did not exhibit any signs of compression, cracked with a weight of 30 tons, and broke to pieces with 35 tons.

Experiments as to the strength of bricks and brickwork made of them were conducted in 1882 by Sig. G. Curioni.† The size of the hand-made bricks used averaged 9'055 in. \times 4'331 in. \times 2'204 in.; that of the machine-made bricks of the first pattern alluded to in the following table, 9'567 in. \times 3'543 in. \times 2'165 in., and that of the second pattern 9'055 in. \times 4'331 in. \times 1'89 in. All the bricks employed were made of the same kind of clay, and under similar conditions. The mortar used was composed of equal parts of Casale Monferrato cement and fine sand from the river Po, and it was allowed five days to set before being subjected to the tests.

Strength of Italian Bricks and Brickwork.

DESCRIPTION.		BREAKING STRAIN IN LBS. PER SQ. IN.		
		Hand-made Bricks.	Machine-made Bricks.	Machine-made Bricks on edge.
		First Pattern.	Second Pattern.	
1. Single bricks placed between two pieces of sheet lead	Max.	1,620	3,488	2,261
	Min.	1,749	3,800	2,176
2. Single bricks with faces brought to an even surface with mortar	Max.	3,741	4,523	3,456
	Min.	3,627	4,184	3,072
3. Pillars of two bricks placed one above the other, faces brought to an even surface, and jointed with mortar	Max.	2,489	2,517	2,116
	Min.	2,031	2,160	2,148
4. Pillars similar to above, but of three bricks	Max.	1,436	2,104	
	Min.	1,494	1,815	
5. Pillars similar to above, but of four bricks	Max.		1,573	
	Min.		1,678	
6. Pillars of three rows of bricks with joints normal to the compressed surfaces. Latter brought to an even surface in each case, and jointed with mortar	Max.	1,252		
	Min.	1,138		

The bricks referred to in the accompanying table were placed flat, except in part of the second series of experiments, as shown, when some machine-made bricks were tested on edge.

Summarising Professor Unwin's account‡ of the researches of the well-known Berlin experimenter, Dr. Bohme, it may be noted that in these tests brick cubes, with different kinds of mortar, were used. They were approximately 10 \times 10 \times 9'5 in., and were three months old. Two kinds of brick were used; namely, Benckendorfer and Hertzfelder. The former had a crushing strength of 263'2 tons per square ft., and the latter 160'9 tons. The strength of the mortar used varied a great deal following the kind. In the end, the ratios of strength of brickwork to the strength of the single bricks were found to be as follows:—

For mortar of 1 lime, 2 sand 0'44
" " " 7 lime, 1 cement, 16 sand 0'48
" " " 1 cement, 6 sand 0'55
" " " 1 cement, 3 sand 0'63
In certain cases it would appear that the

* The Builder, 1848, p. 177.

† L'Ingegneria Civile, Dec., 1882, p. 177; and abstract in Min. Proc. Inst. C.E., vol. lxxiii. (1883), p. 38.

‡ The Testing of Materials of Construction, 1888, p. 439.

diminution of strength in comparative blocks of brickwork is due to the different shapes of the bricks used, or to the shape of the blocks tested, and not altogether to the influence of the mortar joints.

Experiments on a larger scale than the foregoing are expensive, so we need not be surprised that so few have been made. The results afforded by experimental brick beams in the years 1831 and 1851, although not referring to modern bricks, may therefore be quoted as of general interest, and in the absence of better data. The beam built in the former year at Vauxhall consisted of hard stock bricks, bonded in the usual way, and bedded and grouted with a mixture in equal proportions of the best Roman cement and clean Thames sand; it was completely solid throughout. It had 19 courses of bricks, the 13 uppermost courses being two bricks, or 18 in. in thickness, and the 6 lower courses 2½ bricks, or 1 ft. 10½ in. in thickness. The sectional area was, therefore, 13 courses, at 3 in. each = 39 in. \times 18 in. thickness = 702 in.; 6 courses at 3 in. each = 18 in. \times 22½ in. thickness = 405 in.; total sectional area, 1,107 superficial inches. In the lower courses were inserted fifteen lengths of flattened hoop-iron 1½ in. and 1½ in. The beam was supported at each end, leaving a clear bearing of 21 ft. 4 in., and after it had been built about three months it was loaded with 11,200 lbs. of pig-iron placed on a platform which was suspended from the central part of the beam, which weight was increased at the end of another three months to 24,000 lbs. It was then left for one year, when it was broken down by increasing the weight to 50,622 lbs.

With this example in front of them, certain exhibitors at the Great Exhibition of 1851 determined to carry out some experiments on the same lines. Although made to test the strength and other properties of Roman cement, the 1837 brick beam was, of course, indirectly a test on brickwork set in cement and strengthened by iron. It is to be regretted that the results should have been marred by the insertion of the hoop-iron. Nevertheless, the exhibitors alluded to in 1851 built a beam of a similar kind, only with Portland cement and hollow bricks. Another point of difference was that the bricks were all laid as stretchers. With the joints and beds the whole measured in the six upper courses, and

average of 36 in. \times 17'25 in. = 621 in.; and in the three lower courses an average of 16'5 in. \times 26'6 in. = 439 in.; making a total area of 1,060 in. If from this we deduct the forty vacancies (in the hollow bricks) of 9 in. each = 360 in., we have as the net sectional area, 700 in. Iron was used as in the other experiment. After having been erected five months, the beam was loaded, as before, with pig-iron. With 41,600 lbs. two cracks were developed in the four lower courses, at a short distance right and left of the centre of the beam. With 62,800 lbs., which it bore for a short time, the beam gradually separated into two parts as nearly equal as possible, the line of fracture being vertical and indiscriminately through bricks and joints as they occurred.

In regarding the relative strength of these two beams, besides the points already mentioned, we should take into account the differences in sectional area; in the method of building up the bricks in each; and the greater age of the first-mentioned beam before it was finally broken down.

In order to ascertain the influence of flattened iron when built as mentioned above, Sir Charles

* General Pasley, in his work "On Limes," p. 162, mentions five only.

RESTORATION OF SHREWSBURY CHURCH.—During late in February last year, about 50 ft. of the S.W. steeple, Shrewsbury, was blown off by a heavy gale, the masonry crashing down upon the roof, and causing the disaster. It did other damage. The Rev. J. H. St. John, vicar, called on Mr. J. J. Scott, the consulting architect, who determined that the spire happened to be under repair and founded at the top with scaffolding at the moment the storm occurred, exerting a leverage on the structure which the stonework was not strong enough to withstand. It gave way at the point where the new masonry, erected some forty or fifty years since, commenced. The fall of the spire took place in a direction due east from the tower, and to

is directly behind the dining-room, and has two serving lobbies with buttry hatches opening into the dining-room. At the rear of the kitchen are the scullery, larder, pantries, store-rooms, &c., and in the basement in the same wing are the boiler for the hot-water supply and general coal-stores. In the central block, in addition to the dining-room and stores, are the master's office and dining room and the steward's office and telephone room, the two inner halls and principal staircases. The patients' day sitting-rooms, each having an area of 600 sq. ft., are at the east and west ends of the men and women's blocks, and between these rooms and the entrance corridors are the matron's sitting-room on the women's side and the steward's room on the men's side. The lavatories, bath-rooms, and offices are placed in separate wings to each block on both ground and chamber floors. These, together with the entrance lobbies, vestibules, and corridors on the ground floor, have tiled floors and dados. The dormitories on the first floor consist of rooms respectively for five, four, and three sets of patients, the matron's and steward's bedrooms being placed in the towers. Store-rooms, warmed by hot-water coils, for bed linen and blankets, and large cupboards are provided on the landings. The servants' bedrooms and sewing-rooms are over the kitchen department. The floors of all the living rooms, dormitories, halls, and landings are of oak, and the two principal staircases are constructed of teak throughout. Shorland's patent fireplaces and hall-stoves are fixed in the ground floor rooms. The dormitories are provided with extraction ventilators in the ceilings, which are connected with Boyle's ventilators in the turrets. The drains are laid with Doulton's patent pipes, having self-adjusting joints. Mr. Samuel Roberts of Mount Plym, has carried out the general contract for the Home, and Messrs. W. Rowe & Son have executed the plumbers' work, including water, gas, and sanitary fittings. The House, Compton Leigh, has been renovated in order to fit it for a Home of Rest for Nurses, the whole of the exterior walls having been re-rendered, and all decayed portions of the external woodwork renewed. Mr. Samuel Roberts has carried out the works in gardener's cottage, lodge, and in re-rendering the exterior of the house, and Mr. Brimacombe the plumbing and sanitary arrangements. The drainage of Compton Leigh, alterations for laundry, mason and bricklayers' work for new glass houses, general jobbing work and re-forming ground in front of the house have been carried out by Mr. George Hoeking, Compton Gifford. The new viney, peach-houses, plant-house, and conservatory, with heating apparatus for the house and drying closet in laundry have been supplied and erected by Messenger & Co., of Loughborough. The painting and decoration of Compton Leigh have been executed by Mr. Richard Coke. The tiled floors, dados, and terraces, both at the Home and Compton Leigh, have been supplied and laid by Minton, Hollins, & Co., of Stoke-upon-Trent. The clerk of works was Mr. W. Crimp, of Mannamend. The architects for the works were Messrs. King & Lister, of Plymouth.

PREMISES, EDINBURGH.—New premises have just been erected at Edinburgh for Messrs. Jamieson on the site of the buildings destroyed by fire in November, 1892. Mr. Hamilton Beattie was the architect.

FOREIGN AND COLONIAL.

FRANCE.—At its last meeting the Académie des Inscriptions et Belles Lettres has, at the request of the Société Centrale des Architectes selected M. Chamonard, a former student of the French school at Athens, in recognition of his remarkable works on Delos, as the recipient of the Grand Medal of Merit which is offered annually by that Society on the occasion of its congress. The municipal engineers of Paris have discovered the existence of some alarming cracks and settlements in the ironwork of the Caulaincourt Bridge, which is of quite recent construction and crosses the Montmartre Cemetery. The engineers of the Paris, Lyons, and Mediterranean Railway Company hope that the interior and the rails of the new Paris terminus will be finished for the Exhibition of 1900, although the erection of the buildings forming the principal and permanent façade will not be commenced till after the exhibition. An art exhibition will be held on the first platform of the Eiffel tower from May to August 31 next. M. Henri Leriche, the painter, has been commissioned to carry out the artistic decoration of the ceiling and great frieze in the banquet hall of the Préfecture at Nice. A competition has just been announced for the erection of an Hôtel de Ville in the town of Asnières, near Paris. The expense of this building is estimated at 700,000 francs. The jury in the competition promoted by the town of Nevers for the erection of a covered market has awarded the first premium to the design of the architect, M. Brazeau. The second premium has been allotted to M. Lutz. There will shortly be unveiled in the Cemetery of Saint Germain, a monument, erected by public subscription, to the memory of the celebrated composer Frédéric Dupont. The second biennial exhibition of the Fine Art Society of Narbonne will be held from the 1st June,

1895, to the following 31st July. In the banquet hall of the Hôtel de Ville, of La Roche-sur-Yon, has just been placed the model of the statue of the painter Paul Baudry, which is about to be erected in that town. The departmental Council of Isère has decided on the construction of a cogwheel railway from La Mure to la Salette, to facilitate for the numerous pilgrims and tourists the fatiguing ascent to the Calvary of la Salette, which has hitherto been possible only by a mule road. At Pierrelatte, near Avignon and Orange, there have just been discovered, it appears, certain remains and architectural fragments which indicate the probable existence of the ruins of an ancient town buried seven yards beneath the soil. Five new lines of railway are about to be constructed in the department of Saône-et-Loire: from Autun to Chateau Chillon, from Bourbon-Lancy to Toulon-sur-Arroux, from Macon to Fleurville, from Montceau les Mines to St. Baudet, and from St. Marcel les Chalon to St. Martin-en-Bresse. There is some talk of constructing a tunnel through the hill known as the Balcon d'Alsace, in order to unite Nancy and Epinal to Bel'fort, by a strategic railway. The demolition of the fortifications of the town of Cambrai, between the Robert and Notre Dame gates, is shortly to be commenced. An apoplectic seizure has just carried off, at the age of 60, the historical painter, Eugène Bellangé, son of Hippolyte Bellangé, who had a great reputation as a painter of military subjects, from 1830 to 1858. Eugène Bellangé was a pupil of Picot, and had also attempted the painting of military genre, but with less success. He has exhibited two pictures at the Champ de Mars this year.

MISCELLANEOUS.

ST. OLAVE'S GRAMMAR SCHOOL, SOUTHWARK.—An error occurred in our notice last week, page 331, of the Architectural Association's visits to the St. Olave's Grammar Schools. The electroliers were made under Messrs. Singer's supervision at their factory at Frome and not Stroud, as stated in our report.

SALE OF BOOKS.—Some handsomely-bound editions of standard illustrated works upon topography and the arts were recently sold at Sotheby's auction-rooms. The books comprised the following: "Landscape Annual," 1890-91, large India paper, plates by Prout, Roberts, and others (54. 10s.); F. Litchfield's "Illustrated History of Furniture," 1892 (17s.); J. Drummond's "Old Edinburgh," one of 50 copies, imp. fo. (2 guineas); Ackermann's "Microcosm of London," 3 vols. (74. 5s.); "Westminster Abbey," coloured plates by Mackenzie, 1812 (47. 5s.); "Cambridge University," 2 vols., coloured plates by Pugin and Mackenzie, 1815 (47. 8s.); D. Roberts's "Sketches in Spain," 26 fine chromo-lithographs, imp. fo. (17. 18s.); Lodge's "Portraits," in 6 vols., 1835 (47. 10s.); J. Tickle's "Kingston-upon-Hull," 1795 (13s.); Walpole's "Description of Strawberry Hill," one of 50 copies, 1774 (17s.); R. V. Eytton's "Antiquities of Shropshire," 2 vols., in 6 (237. 10s.); J. Nichols's "History and Antiquities of Leicestershire," including the original West Goscoat Hundred, nearly all the copies of which were burnt in the fire at Messrs. Nichols, 4 vols. in 8, 1795-1811, a fine and rare work (370s.); R. Thornton's "Nottinghamshire," first edition, 1677 (74. 15s.); "Cambridge University," by Strype, 1755 (84. 5s.); S. Shaw's "Staffordshire," 2 vols., very scarce (287s.); G. Ormerod's "Cheshire," 3 vols., large paper, 1819 (217s.); J. Horsley's "Britannia Romana," 1732 (184s.); Dugdale's "Warwickshire," first edition, portrait and plates by Hollar, 1656 (74. 10s.); Hogarth's 36 sets of the original engravings, as sold by Mrs. Hogarth in 1784, the "Harlot's Progress," and others with the 4 before letters, (87. 15s.); Turner and Parker's "Domestic Architecture of England," 4 vols., 1851-9, with Sir G. Scott's "Secular and Domestic Architecture," 1857 (34. 3s.); Wilkinson's "Londina Illustrata," 2 vols., 1819-25 (24. 32s.); Cussans's "Hertfordshire" (37. 18s.); Matland's "London," 2 vols., 1755 (175s.); Bayley's "Tower of London," 2 vols., 1821 (17. 2s.); Dibdin's "Ædes Althorpianæ," 2 vols., large paper, 1822 (106s.); "The Rubens Gallery at the Luxembourg," 24 plates, 1790 (17. 15s.); Hearne and Byrne's "Antiquities of Great Britain," with first impressions, 1785 (17. 5s.); and Sir W. Stirling-Maxwell's "Charles V." (17. 15s.).

MEMORIAL, ST. GILES' CATHEDRAL, EDINBURGH.—Warrant was granted on the 25th ult. in Edinburgh Dean of Guild Court to Sir Thomas Clark and others to erect a Marquis of Argyll memorial in St. Giles' Cathedral. In St. Eloi's Chapel, known as the Hammermen's Chapel, on the right of the High Altar, the Marquis of Argyll Cathedral, accommodation has been found for the memorial. The monument is 11 ft. 6 in. wide, by 12 ft. high. It consists of a subbase of alabaster, and this subbase supports at each side two marble columns and pilasters, with bronze ornaments and gilt caps and bases. These columns and pilasters support, in turn, an entablature, finished with pinnacles and pediment, enclosing the memory of arms. Between the pilasters is an elliptical arch, beneath which rests the recumbent figure of the Marquis upon a carved and moulded sarco-

phagus, above being an oval panel for the inscription, with margin adorned in scroll-work. The figure is attired in the costume of the period, and, while the right hand rests upon a Bible, the left clasps a sword. The monument is entirely composed of veined and white alabaster. A window for above the monument is painted in heraldic colours, and decorated with scroll-work and architectural enrichment. In the centre of it is the Argyll coat of arms, and in the other spaces are similar emblems of other notable Covenanters. The entire cost of the memorial is over 1,000l. Messrs. Sydney Mitchell & Wilson were the architects; the sculptor of the figure was Mr. Charles McBride, and that of the architectural part of the memorial, Mr. Wm. Beveridge. The window is being done by the Glass Stainers' Company, Glasgow.

PROPERTIES FOR SALE.—Cromwell House, Marlow, of late years the home, in his native town, of the late Edwin Clark, F.R.A.S., civil engineer, and inventor of the block system of signalling, and the hydraulic graving dock and canal lift. Born in 1814, his first employment in that profession was in surveying a proposed railway between Oxford and Brighton; he was next resident engineer for the Britannia and Conway tubular bridges. He designed several bridges, comprising swing-bridges at Rochester and Lyons, Scarborough viaduct, and the Aire tubular bridge. The old house commemorates by its name the surrender of the town in 1642 to Parliament, when General Brown's forces were quartered there, having destroyed the wooden bridge which is said to have been built by the Templars of Bisham Abbey—Clifford Castle, Herefordshire, the birthplace of Fair Raimond, whose ruins stand on an eminence overlooking the Wyre; for two centuries a stronghold of the Lords de Clifford, to whom it passed by the marriage of Margaret, daughter and heir of Ralph de Cundy, or Toeni, to Walter Fitz-Richard, whose father, Fitz-Ponce, a son of Richard, second Duke of Normandy, had come to England with the conqueror. Their son Walter founded here a cell of St. Mary's, of Cluniacs, subordinate to Lewes Priory, and endowed a nunnery at Goldstow, "pro animabus uxoris suae Margaretæ Clifford et nostrae filie Rosamundæ."

CENOTAPH, HAVERHILL, SUFFOLK.—The Congregational Church in the border town of Haverhill has just had a cenotaph erected upon the north-east side of its interior. It is of late fourteenth century Gothic character, and has been designed by Mr. John S. Corder, architect, of Wimbourne House, Ipswich. The fabric, which measures 7 ft. high by 44 ft. wide, is made mainly of English alabaster, the central shaft alone being of Irish marble from the Middleton quarries. The tablets are of dark Cornish marble, and on these the inscriptions are incised and gilded. The work has been carried out by Messrs. Harry Hems & Son, of Exeter.

CHURCH BUILDING SOCIETY.—The committee of the Incorporated Church Building Society reported at the annual general court held on the 8th inst., at the Church House, Westminster, that the past year showed an amount of work done by the society almost exactly equivalent to that in 1893. Seventeen grants, amounting in the aggregate to 2,165l., had been given for additional new churches, a sum of 385l. had been granted towards the rebuilding of seven churches, and for the enlargement and rearrangement of forty-five churches, 475l. had been given towards twenty missions, and 635l. had been granted. The Archbishop of York presided. The report was adopted, and Sir F. S. Powell, M.P., then moved, and the Hon. G. W. Windsor, Cleeve, seconded, a resolution urging the society's claims for support.

THE SANITARY INSTITUTE.—At an examination for Inspectors of Nuisances held in London on Friday and Saturday, May 3 and 4, 161 candidates presented themselves. Questions were set to be answered in writing on the 3rd, and the candidates were examined *visu voce* on the 4th. The following ninety-three candidates were certified, as regards their sanitary knowledge, competent to discharge the duties of Sanitary Inspectors: R. H. Bicknell, Southsea; A. J. Bobbitt, Homerton; H. Body, Walthamstow; A. C. Boucher, Fulham; R. E. Brown, London; M. Bryant, Wick, Bath; G. E. Burbridge, Frinton, Portsmouth; E. A. Burch, London; F. E. Butcher, Catford; T. V. Allen, Caversham, Reading; T. B. Campion, London; G. H. Carter, London; F. Catmur, Bow; A. P. Crosby, Farnham; H. G. Crothall, Brixton; T. Crover, London; W. B. Davis, Bedford; Miss L. Dean-Pitt, London; J. F. Dymond, Notting Hill; R. H. Ellis, Homerton; H. A. Enders, Derby; E. M. Evans, Nottingham; F. F. Finn, Brighton; W. Flowerdew, Upper Holloway; F. A. Glover, London; J. L. Greatorex, Wandsworth; G. Green, East Acton; Miss K. Hartnoll, London; F. W. Horey, New Cross; A. Hutchings, Brixton; G. B. Jacobi, London; A. Johnson, London; J. Kinsley, Reigate; Miss N. M. Keogh, Chiswick; W. G. Kershaw, Barnsbury; A. E. Killick, Tunbridge Wells; M. A. Kirtou, Devonport; T. A. Laker, London; A. A. Lewis, Wandsworth; Miss G. H. Mackenzie, Edinburgh; W. G. Marshall, Southend-on-Sea; H. Martin, Birmingham; C. C. Mathews, London; F. W. McCarthy, London.

FIG. 27.—8,365, H. Sturm, System of light and
omical building Construction.—8,382, A. Wilcken and
ourgois, Drain-traps for water-closets.

Channell, Q.C., and Mr. R. C. Glen appeared

LONDON.—For painting and other works at St. Marylebone Infirmary, Radham-street, Noticing the
White £2,000 Lilly & Lilly, Ltd. £1,830
Wall 1,800 Barber & Beadman 1,550
Nye 1,870 * Accepted.

LONDON.—For making-up Dickenson-road (mid Section), for the former Urban District Council. Mr. E. J. Lovegrove, Engineer and Surveyor
Mowlem & Co. £45 0 o W. Griffiths £56 6 8
E. Ballard, Limited. 8 0 o Thomas Adams, Wood
George Bell 79 0 o Green 79 17 8
* Accepted.

LONDON.—For repairs, drainage, improved sanitary and other works at St. George's Union Workhouse and Infirmary. Mr. H. Savin Seal, architect, London
Lest & Co. £4,750 Mowlem & Co. £4,300
R. M. Heywood 4,400 N. Lodge 4,193
Geo. Foxley 4,290 H. Wall & Co. Carlton
W. Pearce 4,248 Works, Kentish Town. 3,807
* Accepted.

MORLEY (Yorks).—Accepted for the erection of school building, High-street, for the school Board. Messrs. Holton & Fox, Architects, Dewbury. Quantities by the architects
Sugden, Morley £1,628 14
Carpentry and Joinery—Saml. Blackburn, 2,178 0
Hall's-road, Dewbury 2,178 0
Painting and Glazing—Geo. F. Firth, Morley, 192 0
Slating—S. & J. Thornton, Ecclestone, near Bradford 715 12
Plastering—D. Witty, St. Paul, near Leeds 128 18
Painting—Roylance & Horsman, Leeds 62 12
Joinery—A. Doughty & Co. Ltd., Great George-street, Leeds 8,892 13
Total 8,892 13

NEW ROSS (Ireland).—Accepted for the erection of the Parish Church, for the Very Rev. Canon Kavanagh, D.D., V.G., New Ross. Mr. Walter C. Doyle, architect, Dawson Chambers, Dublin. Quantities by Messrs. Morris, Dublin
A. Cullen, New Ross £16,300

PENARTH.—For pulling down and rebuilding Baptist Chapel. Messrs. Jones & Thornley, architects, St. Mary's-street, Cardiff
David Davies £3,300 o Marsh & Wride £3,401 0 o
M. Tate 3,600 0 Escon & Ford 3,300 0
J. Jones 3,337 10 D.G. Price, Penarth 3,000 0 o
A. Bridgde 3,334 0 o Thus Bevan 2,945 0 o
* Accepted.

PINNER.—For repairs and decorations to Rugby House, Pinner, Middlesex, for the Metropolitan Railway Company, Messrs. Pridmore & Anderson, architects, 25, High-street, Watford.
Main Specification. Extra on Specification. No. 2.
Brightman £350 0 o £10 0 o £360 0 o
Turner 344 0 o 8 0 o 352 0 o
Gould 333 17 6 10 0 o
London & Co. 699 0 o 5 0 o 704 0 o
Lambie 430 0 o 7 0 o 437 0 o
Marchant & Hunt 295 0 o 2 0 o 307 0 o
Cowley & Drake 395 0 o 3 0 o 408 0 o
Tread & Son 395 0 o 3 0 o 408 0 o
Wiggett 379 0 o 38 0 o

RAMSEY (Hunts).—For the supply of 1,250 tons broken granite, for the Urban District Council
Innals Bros Per ton.
Culpe Hall Granite Co. 10 0 and 1 1
Croft Granite Co. 10 0 and 1 1
Ferguson & Starkey 10 0 and 1 1
Wm. Gurney 10 0 and 1 1
H. W. Tyre 10 0 and 1 1
Gray Granite Co. 10 0 and 1 1
Sunderly and Stoney Stanton Granite Co. 10 0 and 1 1
Alex. Healy, jun. 10 0 and 1 1
John Colett 10 0 and 1 1
Whitwick Granite Co. 10 0 and 1 1
L. Sommerfeld 10 0 and 1 1
Ellis & Everard 10 0 and 1 1
Charnwood Granite Co., Charnwood Quarries, near Loughborough (accepted) 10 0 and 1 1

ROWHEDGE (Essex).—For new hall and stables, Lion Field Estate, Rowhedge, for Mr. R. Daniell. Mr. G. H. Page, architect, Trinity Chambers, Colchester
J. Wornerker £430 G. Rackham £159
T. Dupont 305 A. Dias 350
G. Blaise 392 [All of Colchester.]

ST. MARY CRAY (Kent).—For the erection of a shop in High Street, St. Mary Cray. Mr. St. Pierre Hays, architect, 8, Ironmonger-lane, E.C., and Orpington
W. R. Taylor £1,618 T. Durbell £550
Somerset & Son 297 T. Knight, Sidcup (accepted) 297
K. A. Lowe 297

SEVENOAKS.—For levelling, metalling, kerbing, graveling, channelling, and making good of the Blandstone Park road, and the laying of stoneware pipe sewers, with manholes, lamp-posts, gullies, and other works connected therewith, for the Urban District Council. Mr. James Mann, C.E., surveyor
L. Lay £2,190
S. Hudson, Streatham-hill 2,072
* Accepted according to schedule of prices.

SKIPTON (Yorks).—Accepted for the erection of three shops, &c., High-street, for Mr. F. W. Bagnall, architect
Mainey—Thos. Duckett £1,275
Joinery—W. Roberts & Son £1,275
Plastering—T. Bailey £1,275
Painting, Glazing and Papering—A. Calvert £1,275
Slating—Rd. Thornton & Sons £1,275
[All of Skipton.]

SOUTHEAS.—Accepted for the erection of three shops and wash-houses, Albert-road. Mr. Alfred H. Bone, architect, Cambridge
H. Jones, Broad-street, Southsea £1,550

SWANLEY (Kent).—For repairs to properties at Maultan Hill, Swanley, Kent. Messrs. H. H. Hays, architect and surveyor, 8, Ironmonger-lane, E.C., and Orpington
C. Gallett £175 Stebbings & Pannett £150
R. A. Lowe 175 J. Ward, Swanley 157
Somerset & Son 157 * Accepted.

SWINDON.—For erecting an infants' school, and additions and alterations to the Haydon School, for the Roxdowne Chenev School Board, Swindon. Mr. W. Allen, architect, Ryton-on-Tyne, County Durham. Quantities by architect
H. Gerring £315 10 W. Chambers, New Swindon (accepted) £315 0
H. Flewelling 750 0 Swindon (accepted) £315 0
C. Williams 724 17

SWINDON.—Accepted for additions to the "Eagle Tavern," Regent-street, New Swindon, for Mr. H. W. Thomas. Mr. William Drew, architect, 22, Victoria-street, Swindon
Charles Williams, New Swindon £365 17

THROCKLEY (County of Northumberland).—For the erection of a dwelling-house, scullery, stable, cartshed, and out-offices, for Mr. M. Henderson, Mr. W. Allen, architect, Ryton-on-Tyne, County Durham. Quantities by architect
H. Gerring £315 10 W. Chambers, New Swindon (accepted) £315 0
H. Flewelling 750 0 Swindon (accepted) £315 0
C. Williams 724 17

Whole Tenders.
Henderson & Chalmers £955 6 6 Richard Wood, 9, Greenwell-street, Swindon
Anderson & Davidson 927 13 5 Blaydon-Tyne £970 0 0
John See 899 3 0 * Accepted
Single Tenders.—Excavating, Masonry, and Bricklaying.
Ruger Weatherley £474 7 0 M. A. Armstrong £471 0 0
Single Tenders.—Carpentry and Joinery.
Geo. Wilson £350 0 0 J. Mitchell & Co. £560 0 0
Thos. Wadsworth 392 0 0 J. H. Hartford 485 0 0
Thurwell & Sons 318 14 1 J. S. Chisholm & Co. 244 4 4
John Finlay 318 14 1 J. Thompson & Co. 243 0 0
McCallum & Co. 283 0 0

Slating.
Edwd. Beck & Sons £57 5 9 John Hewison £56 11 3
Charles Nicholson 57 5 9 * Accepted

Plastering.
W. B. Wilkinson & Co. John Chapman £73 10 0
Lidd £80 4 4 H. T. Wallace £68 0 0

Painting.
W. Burns £70 0 0 R. Thompson & Co. £27 0 0
H. Adams & Sons 35 10 0 J. W. Jefferson 22 6 0
J. Watson & Co. 28 7 0 J. A. Turnbull & Sons 21 10 3
J. W. Kyle 27 2 0

Painting and Glazing.
C. Robson £37 9 6 M. J. Rutter £7 0 0
J. A. Turnbull & Sons 27 2 0

WALTHAMSTOW.—For making-up Nettle-road and seven others, &c., for the Urban District Council. Mr. Geo. W. Holmes, C.E., surveyor, Town Hall, Walthamstow
C. E. Holmes, Walthamstow

Main Specification.
W. Griffiths £514 1 4 J. J. Bloomfield £39 15 6
T. Adams 485 0 0 J. J. Bloomfield 171 0 0
J. Watson & Co. 28 7 0 J. A. Turnbull & Sons 21 10 3
Jesse Jackson 404 0 0 Walthamstow* 398 0 0

Westbury-road, north end.
T. Adams £200 0 0 J. Reeves £108 0 0
W. Griffiths 192 12 5 J. Bloomfield 171 0 0
Jesse Jackson 180 0 0 G. Wilson* 153 0 0

Silberstone-cum.
T. Adams £180 0 0 J. Reeves £108 0 0
W. Griffiths 181 0 0 Jesse Jackson 144 0 0
J. Watson & Co. 28 7 0 G. Wilson* 153 13 13

Netley-road.
W. Griffiths £316 0 0 Jesse Jackson £27 0 0
T. Adams 297 0 0 B. Bantren 22 6 0
J. Reeves 248 0 0 G. Wilson* 153 13 13
J. Bloomfield 241 0 0

Station-road (south end).
T. Adams £270 0 0 G. Wilson £57 13 13
W. Griffiths 242 12 11 Jesse Jackson 171 0 0
J. Reeves 238 0 0 J. Jackson* 53 0 0

Vernon-road.
T. Adams £140 0 0 J. Bloomfield £110 0 0
W. Griffiths 142 12 11 Jesse Jackson 144 0 0
J. Reeves 138 0 0 G. Wilson* 111 5 4

St. Mary's-cum.
T. Adams £260 0 0 J. Bloomfield £260 0 0
W. Griffiths 267 13 4 J. H. Hartford 485 0 0
G. Wilson 65 9 7 Jesse Jackson 55 0 0

Accepted.
W. Griffiths £316 0 0 Jesse Jackson £27 0 0
T. Adams 297 0 0 B. Bantren 22 6 0
J. Reeves 248 0 0 G. Wilson* 153 13 13
J. Bloomfield 241 0 0

WALTHAMSTOW.—For the erection of a pair of villa residences in Elmstead-road. Mr. Jasper J. Kelly, architect, 25, High-street, Walthamstow
Marion & Goodwin £250 0 0 Dartall Bros. £361 0 0
Thompson 817 0 0 Rawlins & Turner, Wal. 650 0 0
Lawrence 667 10 0 Walthamstow* 650 0 0
* Accepted.

WEST LULWORTH (Dorset).—For the erection of two houses and shop, at West Lulworth, Dorset, for Mr. E. J. Randall. Mr. G. B. Harris, architect, Quantities by the architect
J. Miller £1,257 D. Hicking £1,133

WINTON (near Bournemouth).—For the erection of British and Sunday schools. Messrs. Lawson & Donkin, architects and surveyors, Yelverton-chambers, Bournemouth. Quantities by architects
T. Holly £1,500 0 0 J. W. Lucas £1,460 0 0
Entwistle & Cox 1,500 0 0 J. H. Hartford 485 0 0
Wm. Hoare 1,487 0 0 C. Hunt, Winton* 1,436 13 6
George & Harding 1,464 0 0 * Accepted.

WREXHAM.—For the construction of an iron girder bridge, Five Fords Farm, for the Urban Authority. Mr. J. W. M. Smith, Borough Surveyor, Wrexham
Phoenix Foundry Co. £15 3 0 Cudworth & Johnson £20 0 0
Raybould & Co. 110 0 0 J. O. Brettell 85 8 6
Chibby & Co. 107 13 4 J. H. Hartford 485 0 0
E. & J. Keay, Ltd. 108 8 8 Rubery & Co., Darlas 66 0 0
Fennell & Co. 95 0 0 Wm. South Stafford 66 13 0
Jonathan Curtis 94 15 0 * Accepted.

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The Builder.

VOL. LXVIII. No. 2723.

MAY 29, 1895.

ILLUSTRATIONS.

Competition Design for Christ's Hospital Schools.—By Mr. T. G. Jackson	Extra Large Ink-Photo
Design for Heading to Programmes of the "Musical Guild."—By Mr. Henry Holiday	Double-Page Ink-Photo.
Church of St. Etheldreda, Fulham.—Mr. A. H. Skipworth, Architect	Two Single-Page Ink-Photos

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French Art of the Year.



It may be a question whether, when the Palais de l'Industrie comes to be demolished, it would not be a good piece of policy, in the best interests of French art, to replace it by a building of more limited wall space. There would then be neither the temptation nor the opportunity to collect together such an enormous crowd of paintings, many of which are little credit to the French school, and which jostle each other so that both the eye and the judgment get almost confused in the endeavour to select the wheat from the chaff. With the immense size of some of the paintings one need not quarrel; they would be useless in England, no doubt; but in a country where the Government spends money freely on the pictorial decoration of public buildings there is place for paintings in a decorative manner and on a great scale; one can only wish that it were so in England. It is rather with the quantity and heterogeneous character of the minor works that one is tempted to find fault. No one can pretend to look at them all, if they were all worth looking at; which is unfortunately far from being the case. And one consequence of this is a constant and obvious endeavour, among all but a few really great painters, after sensational subjects and treatment, such as shall compel attention. This is said to be the effect of painting for our own show at Burlington House; yet the Academy is quite a small and select exhibition in comparison with the area of wall to be filled at the Salon.

The result seems to be declaring itself in a slow but sure decline in the standard of French painting as represented at the two great exhibitions. It is true that both at the old and the new Salon there is less of eccentricity than usual; at the new Salon especially we meet with nothing like the rank absurdities which were to be seen in its walls in some preceding years. But both exhibitions, and in the old Salon especially, there are a good many pictures which can only be called vulgar in an artistic sense, and not a few which are

vulgar in another and wider sense of the word.

Among the very large works which may be regarded as decorative paintings, and some of which are truly decorative in style (while others are very much the reverse), there is not as much to interest one as usual. M. Bonnat's large painting of last year, of which we gave an illustration,* though it was rightly criticised as being somewhat sensational in manner and composition, was at least a far more effective work, as a decoration for a building, than anything to be seen in the large room of the old Salon this year. The best in a pictorial sense is M. Gervais' "Maria de Padilla," which has been purchased by the State, and is unquestionably a very fine work in colour and composition, illustrating what to the English mind is a subject that comes under the category of "vulgar," and is certainly the reverse of elevating. But French official selections in art do not illustrate that purifying and ennobling influence on artistic taste which has been supposed by some writers to be a natural outcome of Republicanism. The principal purchase of the year in sculpture, for instance, is M. Fremiet's large group, "Oranges-outangs et Sauvage de Bornéo," the power of which is unquestionable, but which is one of the most brutal and revolting works we have ever seen in sculpture. The taste for cruel subjects is unfortunately too characteristic of French art, without being unnecessarily fostered by a paternal Government. In this same exhibition we have one picture—life-size, too—of a saint being tortured by the application of red-hot irons to the soles of his feet, the effects on which are shown in the most horribly realistic manner; another scene in which a decapitated victim of the guillotine is seen lying in the middle of the floor of an interior; another (a very large work this) of some barbarous Hungarian princess enjoying the pastime of seeing women frozen to death by being placed naked in the snow bound hand and foot; the opportunity being seized to paint the contrast between the living bodies of the struggling victims and the grey pallor of those already dead. Of course we are not for a moment suggesting that it is the business of art to teach religion or morality; that idea is far too prevalent in this country as it

is; and the French might retort against us by pointing to the complacency with which our public accept the dull Biblical pictures of Mr. Goodall or of the late Mr. Long. But surely choice of subject goes for something in painting and sculpture, and a prevalent taste for subjects which are cruel, brutal, or sensual, so long as they are treated with artistic power, is an indication of an unhealthy and somewhat debased state of public feeling. The story in M. Gervais' picture just referred to, which has been purchased by the State, illustrates the sensual element; the scene illustrated is low and even what we should call nasty in some of the details mentioned in the catalogue description, but it affords an opportunity for what is no doubt a splendid painting of the nude figure of the woman who forms the central object in the composition. Now we have so devout an opinion that the nude figure, both in painting and sculpture, is the highest medium of artistic expression, and its adequate treatment the noblest ambition of the artist, that on that very account we dislike to see it prostituted, as it were, to the illustration of scenes in which there is none of the poetry of art; of mere "incident pictures" on a great scale, in which the incident is vulgar and repellent in its associations and treatment.

To return to the purely artistic side of the matter, we complain that the large decorative paintings of the year, with two exceptions, are deficient either in decorative treatment or in point and interest. M. Jean Paul Laurens has hit upon an architecturally interesting subject in "La Muraille, 1218," representing the interior of a great chateau in which a crowd of labourers and fighting men are engaged in completing the upper portion of the fortifications; the spectator is inside the chateau on the level of the platform or scaffold on which the work is going on, the ramparts and turrets forming the boundary of the scene. The idea is a good one for a picture, but the scene does not impress itself on one as very real, and the composition is rather confused; there seems a want of a central and dominating movement. With this may be classed a modern scene of military work, M. Arus' large painting of a corps of engineers at work on the construction of a temporary timber bridge over a river. This is a kind of subject worth recording on canvas, though on this scale a place could only be found for it as a

* See *Builder* of June 2, 1894.

decoration in the hall of some large barracks or arsenal—which is possibly its destination. The practical details of the work are carefully gone into, and the subject gives the opportunity of painting a number of men in strenuous action, and it is well done in this sense; still, one can hardly call it effective from a pictorial point of view. At the new Salon we have the spaces at the extreme ends of the principal galleries occupied by two large pictures supposed to be decorative. Of these M. Roll's "Joies de la Vie" is decorative in style and design; that is to say, it is not a realistic picture; but it is cold and disagreeable in colour and absurd in conception; the sub-title is "Femmes, Fleurs, Musique," which is illustrated by a wooded landscape with a flowery glade in the foreground (all very grey in colour), with nude women lying about among the flowers, and three men in the costume of ordinary life playing violins behind! The combination is worse than ludicrous. M. Roll had better have kept to his cattle scenes. At the other extremity of the range of galleries is M. Lhermitte's large picture "Les Halles," a scene in the interior of the great Paris markets, in which a crowd of people and a mass of provisions of various kinds are painted on a very large scale and with great realistic force and vigour; this is intended for the decoration of the Hôtel de Ville, but anything more absolutely undecorative could not be imagined; it is simply an enormous *genre* picture, of the cabinet type, but magnified a dozen times beyond its suitable dimensions. Remarkable ability there is in it, no doubt, but it is not the kind of work we wish to see an artist like M. Lhermitte spending his time over. Among other works which are intended as decorative, may be mentioned M. Marioton's ceiling design "La Danse," in the old Salon, which is in true decorative style, and is light and effective in the colouring of the blue sky, and the draped figures fluttering in it, but is marred by that unfortunate trick to which some French painters still adhere in ceiling designs, of painting architectural details, balustrades in this case, as if seen in perspective by the spectator looking up from below; a vile habit of catering for optical illusion which nothing can atone for. In the new Salon there is a rather remarkable series of pictures by M. La Touche, a set of the "Four Seasons," commissioned by the Ministry of Fine Arts, and obviously intended for the decoration of a room. Here the Seasons are typified by parties of women draped or half-draped in conventional costume, and grouped amid somewhat idealised garden scenes.—"Le Printemps, ou les Fleurs;" "L'Été, ou le Bain," &c.; and though these are not kept as flat as we used to think decorative pictures ought to be kept, they have the merit of consistency in conception and design, and of warm and luminous colour. The painter's larger work of the same kind, the "Apothéose de Watteau," has the same kind of merit, and is an effective composition as a whole, though marred by the ugly character of some of the heads. But, at all events, this group of paintings represents a class of work which may rightly be called decorative in design, and which has the important element of fine colour, without which "decorative" paintings deserve not the name. Another painting in a very different style, by M. Emile Friant, "Les Jours Heureux," which consists of three panels intended for the walls of the Hôtel de Ville of Nancy, has also the merit of luminosity, combined with a flat treatment, and a great deal of charming expression and character in the figures of the peasants and their children, who are enjoying a day in the fields. Although a more or less realistic subject, this is not a cabinet picture magnified, but a work suited, in its simplicity of line and composition, to wall-painting on a large scale. The central decorative painting of the year, that of M. Puvis de Chavannes, is also to be found at the new Salon, and is

intended for the public library at Boston; the title is "Les Muses Inspiratrices Acclament le Génie, Messager de Lumière." As everyone knows, "génie" has a double meaning in French; in this case it is "Genius," and not "Engineering," which is welcomed by the Muses, though persons of progressive mind might think that there is something to be said for the latter interpretation. The picture is a very long one, intended evidently to occupy the whole wall of a long room with a doorway in the centre of it; the ground-line of the scene slopes away towards each side, giving the idea of the summit of a green hill with the blue sea seen over it; the Muses, in bright white drapery, fly towards the centre of the composition, over which appears "Le Génie" standing on a cloud. We do not know that it is the most interesting or successful of the artist's numerous large wall paintings, but it has his usual qualities of fine design and spacing out of the figures, and a pleasing colour harmony of low tones. A point in the design is the treatment of the two sculptural figures which are painted in as supporters to the door-frame, but which are treated in a subdued grey tone which takes them out of the picture, placing them in an entirely different category from the other figures; they form, as it were, a picture within a picture; a delicate bit of æsthetic refinement. The work which we have referred to as the other successful decorative painting of the year is to be found in the old Salon; this is M. Henri Martin's frieze forming part of a decoration for the Hôtel de Ville. This occupies a large wall space cut into by two arched windows or doors, which govern to some extent the lines of the composition. It is a mystical composition, in which two men, apparently artists, clad in tolerably realistic costume, are seated in the larger spaces left between the arches, and are apparently encouraged or consoled by angels whose figures and large sweeping wings fill most of the remaining wall-space. We presume this is an "In Memoriam" to two deceased artists; or does it figure the encouragement of genius by spiritual aid? Neither catalogue nor picture gives any hint. The subject sounds curious in description, no doubt, and we wish the costume of the two men were more idealised; but it is a remarkable piece of really decorative painting, the colour being, though not strong, exceedingly rich and, moreover, original in effect, and the painter's well-known and peculiar technique suiting exceedingly well with this class of painting, giving it a rough and broken-up texture somewhat like that of mosaic, and far more effective in this sense than the smooth surface of ordinary fresco or oil painting. Indeed, this example seems to indicate that M. Henri Martin's proper and natural work is decorative wall-painting, and we hope he will have the opportunity of doing more of it. His pictorial work in the same room, "L'Inspiration," is by no means equal to the frieze.

Taking the average of the more important pictures of the year which, large or small, are to be classed as belonging to the category of cabinet pictures rather than decorative works, the level is perhaps, on the whole, about the same as usual; and (as usual again) the subjects in which the incident and story are of paramount importance are chiefly to be found in the old Salon, those in which the study and treatment attract us more than the story are to be found in the new Salon. There are exceptions to this in both directions, but this is the general tendency in the two exhibitions, which are really in a great measure parallel to our own Academy and New Gallery. In both, some of the very best pictures are by English artists, and it may be questioned whether Mr. Orchardson's "Madame Recamier," which holds a central and conspicuous place in one of the rooms, is not the best picture of the cabinet class in the whole Salon, taking colour, composition,

and realisation of character together. Mr. Herkomer's lady of last year's Academy appears also, under the new title "Toute Nue, Toute Pure"; we will not say that this competes with the best French figure-painting, but in its total effect of air and colour it holds its place well. The taste for hospital and medical subjects at the old Salon seems on the wane; and the only important picture of the type (as far as we noticed), M. Brouillet's "Le Vaccin pour Croup à l'Hôpital Trousseau," is a favourable specimen of its class, carefully studied and not sensational. Of a similar class is M. Geoffroy's "Le Leçon de Dessin à l'Ecole Primaire," a commission from the Department of Fine Arts, and a very pleasing and sensible work; a study of boys at school in which truthfulness in representation of character and manner (the figures being evidently individual studies) is combined with a broad style and an absence of all merely commonplace realism. Among the works of a classic or academic nature which are still to be found in the old Salon M. Bouguereau's "Psyche et l'Amour," though as cold as all his performances, is singularly graceful and complete in the composition and grouping of the two figures, and M. Retru's "La Nuit Fuyant à l'Approche du Jour," in which Night seems to be sailing down, on a great bird with outstretched wings, into a dark ravine, over the edge of which the morning glow appears, is really a fine and successful thing of its kind. M. Gerôme has been making a curious experiment in effect in his picture with a long Latin title, which is really a new version of "Truth in the Well"—thrown down into it from above, the nude body being only lighted from the vertical light from the mouth of the well (far out of sight in the picture), which is represented as producing a curious cold purple tint in the flesh tones seen in this unusual light; her glass, flung after her and cracked, is in mid-air, just falling, and scatters prismatic reflections. The whole is an exceedingly curious study in effect and colour, though we should hardly call it the most interesting of Gerôme's works. M. Roybet is as powerful as usual, and somewhat less vulgar than usual, in "La Sarabande." M. Tattetgrain, whose range of subjects is exceedingly varied, appears this year with a sea-fishing subject which leads one to regard him as the French Hook, though the figures are larger and more important in comparison with the landscape than is usually the case with Mr. Hook's sea-pictures. Among paintings which aim at a poetic or allegorical meaning, M. Dantan's "Le Temps Passe Vite" is impressive and well-intended, though a little mixed in the allegory; a visionary figure of Time seems to pass before two young lovers seated in a rural landscape. Visionary figures, which one can partly see through, are a doubtful kind of expedient in painting; but nevertheless, this work is no unimpressive. Among subjects drawn from ancient legend, a new and very poetic treatment is given by M. Demont to that of the Danaïdes, and M. Albert Laurens has imparted a kind of fascination to the hideous legend of Pasiphaë, which is treated in a manner to which there can be no objection if it is to be treated at all; and as the multitude probably do not know what it means, no particular harm is done. M. Henner's mannerisms are more marked than ever, and his principal contribution lacks the beauty of sentiment which generally characterised his earlier works. The trick of melting away the outline into a haze has been carried too far, and becomes a mere piece of almost mechanical handling. Among what may be called anecdotal pictures M. Dawant's "Maréchal Lannes," in the convent of St. Polten, tells its story well. The "Offrande à la Vierge" of M. Fabres is a very clever piece of minute detail of the kind which was invented by Meissonier, and merits notice as a return to an old source of effect which has been for some time practically abandoned at the Salon: it seems to attract a good deal of attention.

Among portraits the large and forcibly-tinted equestrian portrait of the Prince of Wales and the Duke of Connaught, by M. Detaille, forms one of the rallying points at the old Salon, and deservedly so. There is a considerable number of fine portraits of the ordinary scale, among which may be specially noticed that of M. Ambroise Thomas by M. Baschet, that of a lady by M. Benjamine Constant—a rather forced piece of art, however; a portrait of a lady by M. Cormon; another by M. Jules Lefebvre; another by his pupil, M. Lucas, and a very large portrait group by M. Chabas, "Chez M. Alphonse Lemerre," a group in the garden of a country-house, among whom are seen M. Daudet, M. Paul Bourget, M. Coppée, and other well-known men of letters. At the new Salon no one shows better in portraits than our countryman Mr. Lavery, whose portrait group of "Madame J. J. C. sa Fille" is especially beautiful.

There seems to be a change perceptible in the tendencies and aims of French landscape painting. We have remarked in former years on the prevalence of large and carefully-studied landscapes which appeared to be absolutely destitute of light and atmosphere. There seems now, on the other hand, to be a persistent endeavour to realise effects of very bright sunlight, in some cases of splendid success. M. Didier-Pouget's "Le Matin; bruyères en Fleurs" is an exceedingly fine representation of the effect of bright early morning light on a landscape full of colour. In M. Bourgeois' "Bords de la Creuse" we have another example of a spontaneous landscape and a river, which is exceedingly powerful in sunlight effect, and several others of the larger landscapes in the old Salon show the same quality. The effect of this is so marked that on coming to the new Salon, on two or three of Mr. W. B. Davis's landscapes, including the one known at the Academy as "Elderberry," called here "L'Été," and the still finer one "Au Fraix" (we forget the name it bore in London), the eye is actually affected with a sense of their being wanting in light. Of course it may be replied that this is all the more proof that they are true to the effect of English climate and light as compared with that of France, but they could have appeared bright by the side of any of the most prominent French landscapes of the Salons of a year or two back. It seems satisfactory to find that the French landscape-painters have discovered that they have the blessings of a brighter sun and a clearer sky than we enjoy, and that this aspect of Nature is worth painting. In respect of sea-painting we can see no improvement, and nearly all the bits of sea-painting in either exhibition which are really good and truthful representations of the sea are not by Frenchmen, but by American-born artists domiciled in Paris.

We have confined ourselves here to indicating the merits (or the reverse) of a few of the most prominent works of the year, and the general tendencies discernable in French painting as represented at this year's Salons; to go further into detail would be beyond our scope or our space. We noted many works worth attention, to which we cannot refer particularly. On the whole, the proportion of good to bad or indifferent paintings is higher in the new Salon than in the old, which is what may be expected from the fact that the actual number of works exhibited is smaller, and the wall-space much more limited. The old Salon suffers in quality, when all round, from the very fact of its antiquity; indifferent works are admitted to fill up the space; but, nevertheless, the best works of the year, in landscape painting, are to be found there.

It would be natural to bestow more space on the sculpture, an art more closely connected with architecture than painting, except in its most purely decorative form, as it is said to be; but we fear it must be admitted that the level of French sculpture, illustrated at the Palais de l'Industrie, is falling very much; at all events there is

very little this year, among the mass of works exhibited, which is of high interest. Remembering what the sculpture collection there has been on one or two occasions during the last five or six years, one cannot tell very well what has come to sculpture in France just now. A general level of execution is always maintained, but the majority of the numerous works of the present year are characterised, as far as conception and design go, either by commonplace or extravagance; and in sculpture it is difficult to say which is worst. M. Falguière, indeed, could be neither extravagant nor commonplace, but he seems to have taken to doing portrait statues of people in hats and greatcoats and boots, which is not what sculpture was meant for, and not what his genius was meant for. The finest and most thoughtful work is M. Mercier's group of Joan of Arc supported by the ideal figure of France; a group intended for Domremy. This is not a sensational Joan of Arc in armour, but the country girl, in her rustic simplicity, receiving from the hands of France (a colossal female figure clad in a mantle covered with fleur-de-lis) the sword, which she grasps and extends in her hand as if unused to it, and not quite knowing what to do with it. A lamb following at her feet typifies the shepherdesses' life which she was to abandon. The conception is fine and pathetic. M. Paul Dubois treats the military aspect of the heroine in a bronze equestrian statue, which is both dignified and animated. M. Puech's vision of St. Antony of Padua is a pretty bas-relief, but hardly worthy of him. Realistic sculpture is well represented by M. Hugues's terracotta figure, "Un Potier." Among the few works which exhibit an individual and poetic character is M. Cordonnier's "Électricité," a curious but animated conception, a figure of a thin nervous young woman standing upright, as straight as a post, with a sarcastic expression of mischief on her face. But there are few things to be seen with anything like the *verve* and originality of this. The majority of the works may be described as "conscientious nudes," to which various poetic names are appended, but the poetry seems to end with the names. It is difficult to account for this sudden quiescence in the creative genius of French sculpture; let us hope it is only a temporary lull. It is at the new Salon, where the sculpture exhibits are much less numerous and usually less important than at the old Salon, that we must look for the most powerful and original work of the year in sculpture. This is M. Bartholomæ's large relief, "Projet d'un Monument aux Morts." At the top of the composition, in the centre, is an arched doorway which one may take, perhaps, to be the entrance to the house of Death, just within which stand a nude man and woman with their backs to the spectator, leaning against opposite sides of the entrance and as if gazing into it.* On either side of this stretches an expanse of wall in front of which are a row of figures, arranged so as to form a sloping line on either hand, in various attitudes and expressions of grief. Below the whole is a tomb with two recumbent figures and an angel watching them. It is not easy to read the exact intention of the artist in every detail, but the general idea is obvious enough, and as a poem in sculpture we have seen few things of late years to equal it in interest and pathos. To see this work is alone worth a visit to the Champ de Mars Salon.

THE LIMITS OF MUNICIPAL ENTERPRISE.

THAT there should be a tendency to urge on Municipal Corporations an increase of their duties and responsibilities in the direction of the ownership and management of various undertakings within the area of their jurisdiction, is not in the least surprising. It

* If we remember right, this central group was exhibited a year or two ago, or a study for it, as a separate work.

is a practical outcome of the spirit of socialism which undoubtedly exists at the present day. It is a less alarming form of this movement to many than are such projects as the nationalisation of the land; but it is important that no one should be mistaken as to the length to which this movement for municipal ownership and management may be carried if once it gets beyond legitimate bounds. We propose to state shortly what appear to be the true limits of municipal ownership and management in regard to matters beyond those such as police, sanitation, and so forth, about which there can be no question.

It is well to bear in mind that a municipal corporation is only one form of representative government, and that the object of representative government is that all classes may have representatives who will manage the affairs of the community for the best advantage of the community as a whole, and not for the advantage of any particular class of that community—in a word, the representatives are elected to govern a locality. These are no doubt very elementary statements, but unless they are recognised and acted on there is no basis from which to start. It is equally obvious that there are certain things which are necessities of existence. No one, rich or poor, can do without light for the purpose of finding his way about a town. Therefore we may go a step further and say that a municipal corporation is entitled to supply certain necessities of civilised existence when those necessities can be supplied to the community as a whole, and without coming into competition with private persons, and are required by the community without distinction of class. Light in the streets of a town falls clearly within this principle. Light in a house would appear not to be within it; the means of illumination are so various that householders may each prefer a different kind of light. It is impossible to supply one kind of illuminating power which is required by the community as a whole. It is equally impossible to find one power which has not rivals. The moment, therefore, that a municipal corporation begins to supply gas or electricity to householders it enters into trade competition. It begins to be a trader, and it is exposed to the fluctuations of trade, and the community as a whole may be called on to pay in case of loss for the supply of an illuminating power which is only used by a limited number of persons in that community. Some even of that very community who are rate-payers and traders who supply a different illuminating power, may have to pay rates which enable the municipality to compete against themselves.

Water, again, is a necessity of existence, from a sanitary point of view. It is obvious, therefore, that it is legitimate for a municipality to supply water to the community. No one need drink it, but every one requires to wash. Water is so essential for all culinary operations, that even apart from its use as a cleansing agent it is probably of sufficient necessity and of sufficient use to every member of the community to justify its supply by a municipality on this ground. But it is equally certain that the supply of water is the only one which is legitimate. On the Continent it has been argued that municipal bakeries should be established. Bread, however, is of such infinite variety that it cannot be regarded as at all analogous to water. Moreover, a municipality which began to supply bread must either enter into competition with private persons, or else the supply of bread must be confined to the municipality, in which event the community would at once begin to suffer from the evils attendant on a monopoly. The same objections apply to the municipalisation of locomotion. It is open to numerous objections. The municipality becomes a trader, and enters into competition with persons or firms who supply means of locomotion. Nor can the supply be general unless omnibuses and tramways

alike become the property of the municipality; even then the supply is not general, there are a certain number of persons to whom it is of no use. It may be said that the supply even partially of the means of locomotion may bring a certain amount of money into the municipal exchequer to the aid of the rates. But if in one instance money is made, in another it may be lost, and if the supply of the means of locomotion is employed for the purpose, so may the supply of tea, sugar, and tobacco—in other words, to allow municipalities to supply the means of locomotion is, in principle, to say that they may take up any form of trading. In so doing a municipality goes beyond its proper duties, which are, in the first instance, to govern the locality. The only exception to this general rule is in regard to the supply of water.

This, as we have pointed out, differs so essentially from the supply of any other article of use that it is within the sphere of the duties of a municipality. These are elementary considerations, but they are not always kept in view. When the Corporation of Manchester and Salford handed over the ratepayers' money to the Ship Canal, they were lost sight of, with disastrous financial results to the localities. When the London County Council became the possessors of a small portion of the tramway lines of London, they again infringed the same elementary and useful principles, which should be engrained in the mind of every member of a local governing body and of every ratepayer who assists to elect that body.

NOTES.

THE opening of the Liverpool School of Architecture and Applied Arts, which took place on Friday last week, is an event of considerable importance, and the occasion was rendered the more interesting by the delivery of an admirable address by Mr. T. G. Jackson, who had been invited to be present on the occasion. The substance of this we give in another column. The tone and tendency of it are most wholesome and practical in the main, and there is little in it with which most artists will not cordially agree. Perhaps we may suggest that there is one side of the subject, as regards the conditions under which architecture is practised, which has been a little overlooked. When Mr. Jackson implies that the architect should be rather a man working at the building itself than a man sitting in an office and making drawings for it—in some cases we fear it might be said, getting them made for him—it may be replied that however well this system may have answered for a Mediaeval cathedral, the conditions are rather different in the case of a modern very complicated building, such as a town hall, in which the convenient working of a number of different departments in their proper relation to each other has to be provided for and considered in the planning, together with the important questions of lighting, heating, and ventilation. No such building can ever be properly planned without a great deal of work on paper, and such as can only be properly carried out on paper. You cannot try an actual arrangement of walls one way on the ground, and then pull them down and rebuild them in another arrangement when the first one is found to be defective or not the best possible. Such things can only be done on paper, and the more thoroughly the work is done on paper first, the more satisfactory is the final result likely to be. Then, again, the practical necessities of modern life have to be taken into account. Life moves faster than it did, and people want their large buildings produced quickly, and this will not be done without a great deal of division of labour and special arrangement for carrying out the whole without unnecessary waste of time. No doubt these conditions are unfavourable to the produc-

tion of the best architecture, but their existence cannot be overlooked, and the architect on the building "in his shirt-sleeves" will hardly be able to take the comprehensive survey of the position which the circumstances require. That an architect should give more of his time and personal attendance to a large building than is often the case we certainly think. Some of the French architects have set us a good example in this. Duc, it has been said, when he was commissioned to carry out his great building, the Palais de Justice at Paris, practically devoted his life to it. That means a small income and giving up the glorious gains of five-percentages on various simultaneous works; but it is the nobler part. In this respect the 5 per cent. system is very mischievous to architecture, and much better opportunities for an architect to do justice to a great work would be gained if he were at liberty (by common consent, that is—of course he is at liberty theoretically) to make a charge commensurate with his genius and position, as a painter can. Finally, we may ask, Do all those who preach the gospel of the personal work of the architect on the building find themselves able to carry it out? We remember calling in one day on two of the authors of "Architecture, a Profession or an Art," and finding them both writing letters in an office like any of the Philistines; one of them, as he conscientiously confessed, "not even having the T-square out."

IN the *Athenaeum* of last week (Saturday, 11) we are told that the German School at Athens has succeeded in putting together some fragments from the pediment of the "Peisistratean Parthenon." If this refers to the foundations lying below the present Parthenon, and presumably begun by either Cimon or Themistocles, that building never to our knowledge attained any pediment sculptures; if, on the other hand, the writer refers to the old "pre-Persian" temple of Athene, whose foundations lie to the north of the Parthenon, that structure was certainly never a Parthenon, and was only in part—i.e., as far as its colonnade—Peisistratean. It is, in fact, to this building, so mis-called, that the sculptures in question do belong. We were present, a fortnight ago, while the fragments were in process of being put together in the annexe of the Acropolis Museum. The work has been a long and difficult one, but crowned with unexpected success. Two fine groups are now so far complete as to make the subject intelligible. They both belong to a Gigantomachia, and include a stooping figure of the goddess Athene, and a fallen giant. They will shortly be published, and we will not anticipate their fuller discussion.

THE betterment question is likely soon to be a thing of the past. At the meeting of the County Council on Tuesday last it was announced that a compromise on the matter had been arranged, and that the advocates of betterment had agreed to what is known as the Manchester clause, with three modifications. These are matters of detail, and we are inclined to think that they improve the clause. The first is that no claim for worsment shall be made in respect of buildings outside the betterment area. The second shortens the time in which an owner can compel the Council to purchase his property; the third amendment excludes any valuation by a jury in case of disagreement, and leaves the matter entirely to arbitration. The clause, as inserted in the Tower Bridge Approach Bill by the Committee of the House of Commons, will therefore have to be altered, either when the Bill comes before the House of Lords, or when it comes up for third reading in the House of Commons. The most satisfactory point of the compromise is that it shows that the antagonism between the two parties in the County Council is lessening, and that

they are setting themselves to do the work of the Council in a sensible spirit of giving and taking.

THE most interesting portion of the speeches which were made last week by Mr. Balfour and Mr. Chamberlain at a banquet given by the London Municipal Society to celebrate the victories at the last County Council election, was that in which Mr. Balfour dealt with the necessity of the best men taking part in the local affairs of London. It is unquestionable that the rural elections to District and Parish Councils have shown very strongly the long and well-marked feature of the best men in a locality interesting themselves in its government. "But," said Mr. Balfour, "it is not always the men who ought to take the lead in municipal institutions in London who actually do so." The accusation against London is just. The last elections to the County Council have shown, we think, some awakening of a more clear-sighted spirit. It is much to be hoped that important public men will continue to point out that there is no worthier end for the ambition and the energy of a citizen of London than to assist in its local government. As Mr. Balfour truly said, London ought to be able to surpass the public spirit which is always visible in the provinces.

THE recent annual meeting—the first which has yet taken place, of the "National Trust for Places of Historic Interest or Natural Beauty," showed that the society is likely to do useful work. A sea cliff overlooking the town of Barmouth has been handed over to it, and the Council is taking steps for the preservation of more than one historic spot. That this society may be useful in drawing public attention to the increasing necessity of preserving the remaining places of historic interest in the country there can be no doubt, but we fear that active interference to prevent vandalism of any kind will be of little avail unless the Trust can back up its protests by substantial pecuniary compensation. We are inclined to think that the most useful function of the Trust will be as an aid to those persons who desire to hand over land or buildings to a body which is of a permanent kind, and may be trusted to take good care of any property entrusted to it for the benefit of the whole community. Sometimes such places may be transferred as gifts, sometimes for a pecuniary consideration.

THE Austrian and German architectural journals have been much occupied lately with an unfortunate controversy as to the relative shares of the late Gottfried Semper and Baron Hasenauer in the designing of the new museums and the "Hofburg" theatre at Vienna. Public opinion, generally only associates Von Hasenauer's name with these buildings, and the deceased baron by no means went out of his way to change the popular belief. Though a correspondent of our own some three years back found Baron Hasenauer in every way ready to acknowledge Professor Semper's share in the work, when interrogated on the subject, we have frequently heard very different stories, and we certainly know of several instances where the baron's friends attempted to publicly ridicule the idea of Gottfried Semper's collaboration. There was an attempt of this kind soon after Baron Hasenauer's death, and this has now led Herr Manfred Semper to publish some documents which do much to clear up the question, but have naturally had the effect of raising a fresh discussion. The anti-Hasenauer version is correct in its facts, but its tone is somewhat too partial. We certainly hold that it would be most correct if simple collaboration on equal terms were now ascribed to the two deceased architects. There is not the slightest doubt that the original designs were by Semper, and also some of the exterior detail, whilst Baron

Gasenauer practically carried out the work done, managed everything, and was responsible for the whole of the elaborate interior decoration and construction. It was the Baron's misfortune that he chanced to be a courtier and a Court favourite, and hence there was a good deal of envy and jealousy excited in regard to him.

THE dispute as to the appointment of the architect to the new Cardiff Museum and Art Gallery, and the action of the Cardiff South Wales and Monmouthshire Society of Architects in memorialising the Corporation on the subject, about which a good deal of comment and correspondence has taken place in our columns, has ended, we think, it ought to have ended, by the appointment of Mr. Seward as architect to the new buildings. It may be remembered that the Cardiff Society of Architects sent a memorial to the Corporation which practically amounted to an invitation to throw the commission open to public competition, and that Mr. Seward, who had already taken some part in advising and making sketches in reference to the proposed buildings, considered that he had a moral claim to the appointment of architect to them, and that the action of the Society was an attempted interference with his position; a view which we endorsed as soon as we had all the arguments on both sides before us. The Corporation, according to the report of the meeting of the Museum Building Committee in the *South Wales Daily News*, have fully accepted this view of the matter. The memorial from the Society of Architects was read at the meeting, after which a letter from Mr. Seward was read, asking the Committee to take into consideration certain facts relating to his position in the matter, and which have already been given in our columns. On this the Mayor said that he wished, as Mayor of Cardiff, to move himself the proposal, in order to give proper effect to it, that Mr. Seward should be retained as architect for the new building, observing that if Mr. Seward had no legal claim on them he had certainly a moral claim. The resolution was carried unanimously, and was followed by another to the effect that the memorialists should be informed that the Committee felt itself morally pledged to Mr. Seward. It is noticeable that in the course of the proceedings a letter was read from Mr. Jenkins, of Llandilo, stating that his name had been attached to the memorial without his knowledge or consent. The result will probably convince the Cardiff Society of Architects that, to say the least, their action was a mistake, and it is to be hoped that the subject, and a certain amount of bitterness which arose in regard to it, will now be forgotten as soon as possible.

THE lectures for shop and out-door foremen, now being given on Wednesday evenings by the Carpenters' Company, at Carpenters' Hall, London Wall, have so far been admirably adapted to the requirements of those for whom they are intended, and have been given before a large number of students. The lecture by Mr. James Little last Wednesday, on the setting-out and construction of staircases and joints in masonry, was especially thorough, but it was not easy to see the details of some of the lecturer's rather small diagrams, and it was quite impossible for those students who were compelled to sit some distance from the low lecture-table to see the models which were exhibited and described by the lecturer. The floor of the room is on one level, and it would, perhaps, be unreasonable to expect the Company to make any alteration in this respect, but we would suggest that, where possible, the diagrams should be larger, and that the room for the exhibition of objects should be so arranged that every student would be able to see without difficulty the excellent models which are shown and described.

WE have before us two reports to the Local Government Board, one by Dr. W. W. E. Fletcher on the Sanitary Circumstances of the Desborough Urban District, and the other by Dr. S. W. Wheaton, on the Prevalence of Fever in the Mold Urban Sanitary District. In regard to Desborough, the water supply seems to be of a very unsatisfactory nature. The sub-soil is very open and porous, and rests upon a bed of clay which holds up the soil-water; hence, water is readily obtained by sinking wells down to the clay. Water thus obtained forms the only supply for drinking and cooking purposes in Desborough. The wells, mostly draw-wells, are said to average some 20 ft. in depth; they are dry-stained with local stone, and consequently are not secured against soakage into them of water from the superficial soil: in fact it is by such water that they are fed. The nature of the soil and the proximity of most of the wells to various possible sources of pollution render them very liable to contamination. Over 230 of these wells exist in the village, and nightsoil and refuse removed from privy middens are used on gardens, not infrequently in proximity to the wells. In the case of the Mold Sanitary (?) District, sheer filth seems to be accountable for the prevalence of fever in the district. The privies belonging to some houses are in such a filthy condition in many instances that the people cannot use them; consequently the ground behind the houses is littered with excrement. The condition of some houses in a court in Milford-street is thus described: "The houses are very old; the floors are of brick, and for the most part covered with dirt; the walls of the houses in which fever has occurred are covered with filth, and there is no spouting for the conveyance of rain-water from the roofs. There are no house drains; liquid refuse is thrown on the surface of the ground, where it stagnates in pools, the overflow from which passes through a hole in the wall into an adjoining field. Into this field, the wall bounding which is situated about five yards from the houses in the court, several midden privies belonging to dwellings outside the court discharge through holes in the wall, and filth from them, together with liquid refuse from the houses, accumulates in pools on the surface. At the time when the fever first occurred here the privies were so full that the filth in them rose to the level of the seats, and people were unable to use them. Subsequently these privies and middens were partly emptied, but not by the Sanitary Authority; there are still large accumulations of filth remaining in them." Does the Mold Urban Sanitary Authority intend to take any steps to remedy this state of things?

AN old thatched cottage in London, only three miles and three furlongs distant in a straight line from St. Paul's—this, assuredly, ranks, after its kind, as one of the strangest survivals that can now be found. The cottage is in Paddington, standing on a plot of land behind St. Mary's-terrace (east side), and is occupied by the caretaker of the adjacent "Cenhadaeth Eglwysig Cymraeg," or Welsh Church of St. David's. The church is but a temporary iron structure, to be replaced shortly by a new one, together with schools and a vicarage, and to make room for these the cottage will be pulled down. It is approached by a pathway lined along one side by trees; its ground-floor, having two doors with porches, is built of flint and rubble of pebble covered with rough-cast, the attic floor, gained by an iron staircase, has dormer-windows. There are eight rooms in all, much modernised; the large room in the first story is fitted all round with cupboards, the porches even are similarly fitted. This singular relic of a bygone time when the village green, now considerably curtailed, extended to its doors, and westwards to Dudley Grove, and along the south side of

Harrow-road opposite the church, is known in the neighbourhood as Chambers's Cottage, and, it is said, was inhabited by a banker, so-named, in the early years of this century. It is, however, of a much earlier date than his day. The cottage and land, we gather, were given to the Welsh congregation, about five years ago, by the Ecclesiastical Commissioners. We notice, too, that from Dudley House, or Grove, at the foot of the bridge across the canal basin and the railways, have been removed the wooden out-buildings in which Matthew Cotes Wyatt modelled and cast his statue of the Duke of Wellington, now at Aldershot. The statue was drawn from that foundry to Hyde Park Corner on September 29, 1846.

THE Earl of Dunraven made a sensible protest in the London County Council in favour of throwing open the building work of the Council by public advertisement, on the ground that the Council were trustees of public money and were bound to adopt whatever system would carry out work at least cost to the ratepayers. The appeal to give the Works Committee the opportunity of going on further, and see if they would not make a good thing of it, he trenchantly characterised as "a gambler's argument." The resolution proposed by Mr. Beachcroft was negatived, but the majority against it was not a very large one, and perhaps in time the voice of common sense and sound economy may yet be listened to.

ARCHITECTURE AT THE ROYAL ACADEMY. II.

THE central place in regard to secular or business buildings is occupied by Mr. Waterhouse's water-colour drawing of the Prudential Assurance Company's offices at Edinburgh (1,463). No plan is given; we wish the Academician architects would set the example of always appending plans to their drawings, and then perhaps others who omit this necessary explanation of an architectural design would follow their lead. The site is an angle one, which gives Mr. Waterhouse the opportunity of accentuating the angle of the building in his favourite manner, by developing it into an octagonal turret. The ground story is occupied by large shop or office windows, differently treated on the two faces, and this variety in treatment is carried out in the arrangement of the gables which break the roof-line. Over the second story a strong modillion cornice runs along both faces and binds the whole together. The drawing is executed in the free and powerful watercolour style which the architect has made his own.

Public buildings and street buildings are not very numerous this year; the majority of those not already described belonging to the class of domestic architecture. Among the few buildings of this latter class is Mr. Bottomley's "Grange-road Schools, Middlesbrough" (1,424), a rather slightly-executed water-colour drawing of a red brick building of a simplified Elizabethan style, or approaching to it, with an octagon turret at the angle, which comes in well; the general effect is picturesque, and suitable to its purpose; there is unfortunately no plan. Mr. Field's "Proposed Hampstead Library" (1,438), is, we presume, a competition design; a plan is given; for a building in which aspect is so important, a north point should have been added, as indeed it should be on all plans made for exhibition and to explain a design, but this is a detail seldom remembered. The building is a very plain brick one with a heavy cornice which gives a certain dignity to it. As a matter of expression we should have preferred to have seen some distinction of treatment between the windows to the left of the entrance, which light a large room, and those on the right, which light the lobby fronting the reference library. The latter is, we presume, lighted from the top, though this is not indicated. The general character of the building is suited to its purpose and also to the architectural character of the locality.

No. 1,458 is the premiated design for the Halifax Bank, by Messrs. Horsfall & Williams. We cannot say very much for the architectural interest or originality of the design, but it must be admitted that it is exactly the kind of architecture that bankers generally prefer. To most

of them a bank is not half a bank unless it has pilasters on the front. It is perhaps with this conviction that Mr. Tulloch, in his detail drawing of a portion of the elevation of a design for the same building, uses attached columns over a rusticated granite podium; but there is more character in this design, in which the appearance of strength and massiveness has been specially studied; a section of the wall is added. This kind of geometrical detail drawing is a type of drawing of which we would gladly see more in the Architectural Room, though it was hardly very fair to the author to hang it without the general design, which we believe was submitted. Another design for the Hampstead Public Library is exhibited by Mr. Arnold S. Tayler (1,459); it would be difficult perhaps to define why, but it suggests a school building with a chapel attached, rather than a public library; it has the character of domestic architecture, which is proper to a school, but not to a public library. A study for a public library is exhibited by Mr. Percy E. Newton (1,588), being a perspective view of the original and picturesque design which gained him a Royal Academy prize early in the year. No plan is given; if we remember right, the elevation is not altogether a very complete expression of the plan. Whether this specially suggests a library or not, it at all events suggests a public institution on a small scale; there is, perhaps, a little too much apparent effort after originality, but the originality is at all events obtained, though a little eccentricity in some of the details requires toning down. A sculptured frieze is well introduced, and is an important addition to the character of the building.

Messrs. Young & Hall's "Hostel of God: Free Home for the Dying" (1,473) takes the form of an irregular quadrangle, with the fourth side open. The plan is deficient in having no indication of the purposes of the various rooms, except the beds, which show which are the wards; and as these are all grouped at one side of the quad, we presume that is the sunny side, but here again a north point was wanted. The building, shown in a neat line drawing, is simply and suitably treated; this is a case in which quiet and unpretending treatment is the most suitable architectural expression.

Among small public building designs Mr. Tulloch's competition design for "Municipal Buildings at King's Lynn" (1,493) is noticeable as showing a peculiar treatment, with the walls partly constructed in squares of dark and light material, which no doubt has been adopted to sympathise with local architectural character; a course which is always to be approved of, unless perhaps where the new building is a large and important one of different scale and for a different purpose from the existing buildings of the locality. This, in its peculiar style, is a pleasing and suitable design for Municipal offices for a small town. Mr. Campbell Jones's suggested design for "Town Hall, Baldock, Herts" (1,498), a pleasing little building in very quiet style, has on the other hand rather too much the appearance of a row of cottages to be quite suitable as a town hall even for a very small place, as this obviously is.

Messrs. Clark & Moscrop's "Selected design for Municipal Buildings, Darlington" (1,570), one of the larger exhibits, owes a good deal to the beautiful drawing, by a well-known hand. No plan is given; the exhibit is simply a picture, or rather three pictures. The treatment and grouping of the windows, pilasters, and porches has a very good effect, and seems to have been carefully studied, though it must be admitted that the details are all of a character which may be considered now to be common property. Another municipal building is the selected design for Llandudno, by Mr. Silcock, also devoid of a plan: it is a pleasing building of Classic type, with a plain rusticated ground-story and an order above; some carved panels introduced between the columns, near the top of the wall, give a little special character to it, and the whole is a pleasing and well-balanced building, except that we would point out that the balustrading on the recessed portion of the front is too large, and out of scale with the other details; this might be remedied in execution, as we presume the building cannot have progressed very far as yet.

Mr. Aston Webb's "Stafford County Infirmary—remodelled" (1,555) is an interesting example of what may be done to improve and give interest to a plain utilitarian building by remodelling, without altering its utilitarian character. A small elevation and plan of the building as it was before remodelling are added below the perspective view, as well as the amended plan. An old-fashioned and very

in-and-out plan has been converted into a symmetrical and good working plan, with important additions at each end, and in place of the old mean-looking and irregular elevation we now see a building which, in spite of its plain character, has a certain amount of architectural dignity imparted to it by the balancing of the blocks on each side of a centre, the accentuation of certain portions by a little simple architectural treatment, and by the practical improvement of cutting off the ward blocks from the administration centre by partially open arcaded corridors of communication. A small building of the hospital class which may be mentioned is Messrs. Cheston & Perkin's "Seaside Convalescent Home," for the East London Hospital children (1,528); a simple building of domestic character, with the bath and lavatory portions (those for the boys at least) placed in an octagon turret which gives a feature to the exterior. Plans to the same scale as the elevations are given, and a north point. The building is a very pleasing one of its class, but in the plan the retiring-rooms are hardly as well placed as they might have been: it would have been better to have placed the door of the girls' room further from and not immediately in sight of the boys' room, and the boys' water-closet upstairs is separated by the whole width of the building from their dormitory.

Mr. Walters's "St. John's Seminary, Womersley" (1,576), is provided with a plan, but it would have been more intelligible if a list of references giving the use of the rooms had been provided. Where the plan is on too small a scale to allow of the names of the rooms being legibly written on them, it is always possible to append a list of their uses, with reference letters to the rooms. Architects may say that no one will take the trouble to look at them, and, of course, the general public will not, but architects who go to look at the designs in a serious spirit will. In the case referred to the plan is a long line of buildings with a chapel at one end, and two transeptal portions in the main building, which appear to be large school-rooms, but these are connected by a very long apartment (with side rooms opening out of it), 150 ft. long and 25 ft. wide. If this is only a corridor, why such a width? The small rooms on each side of the chapel, which have through communication with each other, but none with the chapel, are also rather inexplicable. The style of treatment, a sort of Queen Anne, of brick with light stone bands and voussours, &c., is rather curious for a building of this type, especially when we come to the chapel, which, with tower terminated by a hipped roof and a little classic lantern, has a very secular, even "business" look. The whole building, however, is an interesting and unusual one, which is the reason we should have liked more explanation of the plan.

In speaking of the church designs in our former article we passed over accidentally an unpretending pencil drawing of a "Design for Wesleyan Chapel at Blairston, Mon." (1,436) by Mr. W. L. Griffiths, which is a work of some originality in a plain and simple manner. The general feeling of it is Gothic, though the windows are square-headed, and at the sides are merely of the sash-window type, with corresponding dormer windows over them; at the end is a large multilobed window, and at the angle a square turret finishing with a circular stage with buttresses projecting to each angle of the square. This seems to be an attempt to provide a chapel of the plain character probably suggested by Welsh Wesleyanism, but at the same time to give it a little architectural character, and this has been successfully done.

We defer our remarks on house architecture and decorative work and sketches to another occasion.

THE ARCHITECTURAL ASSOCIATION: TREILLAGE.

THE ordinary meeting of the members of the Architectural Association was held on the 10th inst., in the Meeting Room of the Royal Institute of British Architects, Mr. Francis G. F. Hooper, Vice-President, presiding.

Mr. W. B. Dukes having been elected a member of the Association,

A cordial vote of thanks was passed to Mr. Mountford for allowing the members to visit his building, St. Olave's Grammar School, Southwark, on the preceding Saturday, and for kindly providing tea.

It was announced that the annual dinner of the members of the Association would take place on Friday, the 31st inst., at the Holborn Restaurant. The Chairman said that in accordance with By-

law 31 he had now to submit the nominations of officers for the coming Session. The members had heard the names proposed at the last meeting, and in addition, Mr. A. W. Webb had been nominated for election on the Committee, being proposed by Mr. Collard, and seconded by Mr. Parkes.

Messrs. Tyers, Taylor, Agutter, and Greeno were then appointed scrutineers for the election. Mr. John Belcher next read the following paper on "Treillage":—

In addressing you this evening on "Treillage" it may be objected that I have selected a somewhat trivial subject, and one unworthy of the serious attention of an architect. But I venture to do so because I am convinced that (in the architect's hands) it is a simple and suggestive medium by which he can obtain important and good effects in connexion with gardens and domestic buildings.

Wherever wood construction has been in vogue varied treatment of "post-and-rail" and "lattice-work" has been in use all the world over.

India and Barmah, China and Japan, each has its characteristic treatment worked out with wonderful elaboration and finish. The familiar Cairo lattice-work is another variety of the same thing in the East. While every European country upon which the sun shines has its own method of affording shade and shelter by trellis-work.

The words "treillage" and "trellis" are sometimes used interchangeably, but the distinction between them would seem to be that treillage, originally at any rate, meant a series of posts and rails, to support espaliers and fruit-trees, while trellis was appropriated to mere lattice-work.

The comprehensive title of "trellis-work" is now, however, in general use for all varieties; while "treillage" is a technical term (obviously from the French) "not generally understood of the people."

Trellage probably originated in Italy, in vine-training, and its use extended for trailing plants and creepers. It thus came to be used in pleasure-gardens in connexion with trellis proper, and a recognition of its use and beauty so combined led to its adaptation to architectural treatment. In old tapestries as well as in illuminated MSS. you will find trellis-work and palisades represented in many garden scenes. There is a beautiful picture by Luini (date about 1490) entitled "Our Lady of the Lattice," which shows that treillage was appreciated by the painter.

Mr. Reginald Blomfield, in his book on "The Formal Garden in England," gives an illustration of a garden dating from the latter part of the fifteenth century. It is taken from "The Romance of the Rose," in the British Museum. It is a walled-in garden sub-divided by a trellis fence in which is an arched gateway with trellis gates.

Again there is a very suggestive example in "The Gardener's Labyrinth," published in 1577. The gate at the top is the exit into the open country beyond, and the archway on the right is the entrance which communicates with the cultivated grounds. The central enclosure is formed of ornamental pilasters and trellis-work.

I do not propose to attempt, even if I were able to do so, any historical description of the gradual development of trellis-work. My object is to suggest its more extended use and recognition.

I would point out that it has a poetical and romantic side as well as a useful one. Such a medium may be to the architect what clay is to the sculptor: in it he may venture to give shape to some poetic dream of ethereal architecture which has visited his brain, or at any rate (if this seem too large a flight of fancy) he may realise, if only temporarily, some playful fancy for his own satisfaction in work which from the very nature of its material cannot be taken seriously, or raise great expectations. It is the ease and facility with which daring experiments can be made which render it valuable. It can be altered and shifted at pleasure until the desired effect is obtained in a way which more solid and valuable materials prohibit.

And it thus affords opportunities for judging effects which may subsequently be translated into stone or brick. So that those workers who are yet in the flush of youth, and who possess that enthusiasm which in youth is the natural prescriptive right of all, while its retention in advanced age is a special grace given but to the few, may even find in trellis-work a means of expression of their "soarings after the infinite." To the student it presents the advantage of a material in which he can try experiments. He can buy a bundle or two of plasterers' laths and interlace them, and form panels and arches and many

devices within a few feet of the back wall of his garden, which will increase its interest. And beyond all this I think trellis-work itself is capable of a further development—of being adapted to other uses than those to which it has hitherto been applied—uses for which its nature and lightness render it suitable, while its decorative character must be recognised by every artist.

As its form and use grew out of the necessities of the garden, I will give priority to the consideration of its use and value in laying out a garden. I suppose I may take it for granted that an architect admits the importance and recognises the advantage of the "formal" garden in the immediate proximity of his building.

The T-square and set-square should be used in planning the courts and spaces outside the four walls of the house. Its straight lines should be extended and linked with nature, stretching out on every side like tendrils to attach it to the soil. This is effected by enclosing garden-walls, and entrance and kitchen courts, by terraces and tennis grounds.

My partiality for the formal old English garden tempts me to a dissertation on its advantages, but I must confine my remarks to the employment of trellis-work to obtain certain effects.

In the art of laying-out a garden, as in architectural design, there is a certain seductive mystery gained by partially concealing and judiciously screening some parts from immediate view. By this means the imagination is tempted to conjecture the presence of hidden delights beyond, and interest is quickened in expectation of some further enchantment.

Besides the fact that divisions of some kind are necessary for such surprises to the casual visitor, they have always the additional and permanent advantage of affording seclusion, quiet, and comfort. The very flowers and shrubs enjoy the retreat, for in the shelter they luxuriate, and their sweet fragrance is not dispersed by rude winds. Tall hedges of yew, laurel, or holly form substantial divisions, but years must elapse before such hedges can be effective. And here the common or garden trellis will prove the temporary substitute. Against it the hedge can be planted and protected and trained. On the wood-trellis roses, clematis, jessamine, and honeysuckle will climb readily, and show their preference for it over cold and uncgenial iron rods and chains or wire.

With the flexible laths, deep archways can be formed in the trellis division just long enough to form a dark frame to the picture beyond. Or if a peep is required here or there, a few laths can be cut and a bent piece or hoop of wood, circular or oval, inserted, forming an unglazed window in the trellis or hedge. There is an example in the Penshurst garden.

Again, should it be desirable that the upper part of a high screen, or parts of it, be more open or only partially hide what is behind it, then the trellis can be cut into patterns more or less open as desired—sometimes in panels, sometimes in a running pattern.

It is to the credit of lawn tennis from the point of view of the architect, that it has given him an opportunity to make some formal division of the grounds; and in this case the trellis screen is of such obvious utility in protecting the flower-garden, that it will appeal to most clients. If the ground for the tennis-courts is sunk, as it should be, the height of the slope and fence combined will suffice to stop the balls passing beyond.

How difficult it is to persuade a client to screen off any part of his ground! He has an idea that he will lose something unless he can see it all at once; that the extent of his possession will not be appreciated by others.

An Englishman will go any length to obtain a separate compartment to himself in a railway train, yet has not the same desire for seclusion on his own land. His active temperament and love of exercise draws him to the open country. Whereas the Dutch, on the other hand, whose grounds are restricted, like repose and seclusion, and the Chinese, who are not walkers by choice, prefer to cram into the smallest area diminutive imitations of nature in every mood, with mountains, rocks, water, rivers, bridges, all in strange profusion and exaggerated quaintness.

Examine an old willow-pattern plate and see the trellis-work in use, the palisading, the bridge, and the varied trellis patterns suggested in the margin.

I can only allude to foreign work now, and must confine my attention to our own traditional methods, which have been largely formed on the Chinese.

Judging from the accounts preserved of work done by Henry VIII. at Hampton Court after

Wolsey's death in 1530, he must have made use of trellage and trellis very largely. We find described 180 posts and "960 yds. of rayle," painted white and green.

In the design of the garden in the "Gardeners' Labyrinth" we have evidently an early architectural treatment, showing pilasters or terminals with panels of trellis-work.

In some old gardens the enclosures are shaped and laid out in geometrical forms, niches for statuary or vases, circular apses for family or social gatherings, and sheltered places for one or more. I have just completed in this manner a rose garden with a rose temple, of which I have brought you the plan and details. Open seats in the shade are preferable to the highly-varnished "rustic summer-house" atrocity, which is the cockney's delight!

Trellage suggests the shady walk or covered alley. The posts with top rail and cross rails on which may be grown roses, honeysuckle and such like.

The Italian treatment of the horizontal tie is excellent, the shaped ends projecting beyond the post; in profile they group well and look picturesque.

The Chinese and Japanese have a similar treatment of the horizontal bar over entrances, but the ends are turned up.

Bacon in his essay on an ideal garden says:—"For the ordering of the ground. . . I leave it to a variety of device. . . Little low hedges, round like welts, with some pretty pyramids I like well; and in some places fair columns upon frames of carpenters' work."

These trellis columns are very effective, and can be used for garden retreats and in conservatories, for round them many flowering creepers can be entwined.

One of the most successful examples I know of open trellis columns and entablature and cornice is in the garden of Mr. Alma Tadema. It was carried out some years ago by Mr. Brydon, who has most kindly lent us his drawings. You will appreciate, I know, these working-drawings and studies. Nothing could be better than this bit of trellis architecture, which is beautiful in summer and winter alike.

I will ask you to note the plan. Its arrangement gives length to the lawn, while the open appearance is still preserved; but in walking along the pathway the spectator is partially screened, and enjoys a succession of framed pictures between the columns. At the circular apse round the edge of the semi-pond, the columns are placed closer together and form a protective fence. They are reflected with their rose attire in the water beneath them, a happy mixture of nature and art. It is not architecture in the severe and solemn stateliness of public life, but as it were relaxing in private, and with light and playful fancy mixing with the flowers in their own domain; disporting with freedom in the sweet seclusion of the garden enclosed.

It may be well, while we have so good an example before us, to examine the detail and construction, and learn how this fairy-like effect is obtained.

There is first of all a certain commendable and quiet humour evinced and maintained throughout.

The interpretation of columns and entablature into trellis-work is worthy of your attention. The "flutings" of the column are represented by the voids, and the "fillets" by the laths. In the lower part of the columns, to one-third of their height, there are "reeds" represented by circular rods. The laths and reeds are fastened to rings at intervals. The "Ionic caps," with their "volutes," are ingeniously managed. The introduction of the "triglyph" in this "order" is also amusing. Then a fretwork pattern is happily introduced in the fascia, and round balls at regular intervals in the bottom member. These devices I shall have occasion to notice in pointing out developments in some seventeenth-century examples. There are other architectural garden "properties" shown on the drawings which go to prove how adaptable trellis laths are to carved and other work.

In 1773, Sir William Chambers published a "Dissertation on Oriental Gardens," and illustrated his designs for the Pagoda and Chinese temples at Kew. I have reproduced one example. His work probably encouraged and extended the use of trellis-work in England, so that trellis verandahs and porches became exceedingly popular. They were used, not only in favourite seaside resorts and suburban residences, but examples are also to be found in fashionable neighbourhoods and round the parks. And I now propose to draw your attention to some examples

of these which I have collected, and which are either good or instructive.

In Piccadilly, for instance, there is a good and refined example at the residence of the Duke of Cambridge. It is of the "Adams period." The division of this long verandah is effective. The larger openings are in front of the windows, and the intermediate arches, with their double circle ornament above, make a pleasing diversity. The construction is very light and suitable to a balcony carried on consoles.

Example No. 2 at the Marble Arch is inferior though good in its way. The projecting porch no doubt determined the width of the arches, and the divisions are filled in with lattice-work. Here the fascia is open and the pattern varied. You will see the same fascia pattern in Example No. 3 at the corner of George-street, Hanover-square. This is a most fascinating one of excellent proportion. Here we see a valance introduced under the gutter (a feature which found great favour with engineers in finishing the platform covering to railway-stations).

In Example No. 4 there is a similar valance both to the verandah in the right-hand corner of the view and that to the bow window. The latter is carried by slight reeded columns and caps, between these is a kind of trellis curtain and fringe of bells which gives it a Chinese flavour.

There is another form of valance and post to the upper balcony in Example No. 5. The lower balcony, which has evidently been designed from trellis examples, cannot, however, be claimed as such.

Still another variety of "valance," and probably an earlier one, is seen in the interesting Example No. 6. And I have seen others showing a still more realistic curtain treatment, which I fancy must have been designed by the same hand, for the intersecting circles in the pilaster and filling in of the spandrels of the Tudor arch are the same.

In Example No. 7 we have a departure from the lattice-work and a more open treatment of the divisions suggested by Chinese examples.

A most striking and clever adaptation of Chinese forms is seen in Example No. 8, and the panel over the arch shows how openings can be ornamentally formed in the trellis-work.

Example No. 17 is a good and simple bay-shaped verandah. The treatment is excellent. I commend it to your attention, when you are passing Grosvenor-gate. It is at the corner of Upper Grosvenor-street.

The other examples are but variations on those I have already described. Nos. 13, 14, and 15 are taken from designs by C. Middleton, published in the last century by J. Taylor.

In passing, I should like to draw your attention to the wrought- and cast-iron railing enclosures to the balconies; they partake of much of the refinement of the period of the trellis verandahs.

I have refrained from describing examples of iron trellis-work, as I consider they form a separate subject. I have, however, brought one or two examples. The one from a house opposite the Marble Arch is good, and the treatment of the balcony railing interesting.

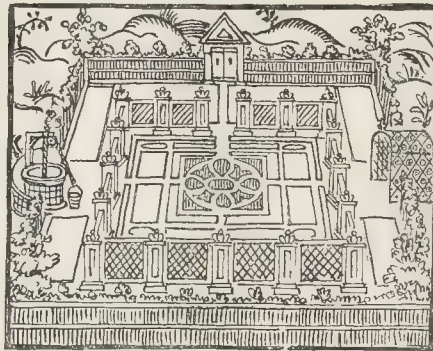
The stone or marble trellis of the East, and the marble trellis of Italy, contain many forms which can be translated into wood treatment, but it cannot be too strongly insisted upon that the forms suitable to one material are unfit for, and should not be imitated in, another.

The construction of fences, arches, verandahs, and porches in trellis-work is exceedingly simple. In division fences the posts vary in thickness, according to their height and distance apart, and are frequently finished with some sort of terminal; a small fillet is all that is used to keep the ends of the laths in position against the posts. The top and bottom rails are often plain, the top having a projecting cover piece, or are sometimes moulded, and the bottom rail is kept well off the ground. The laths are arranged in several ways, and in larger or smaller meshes, as lightness or increased density is required.

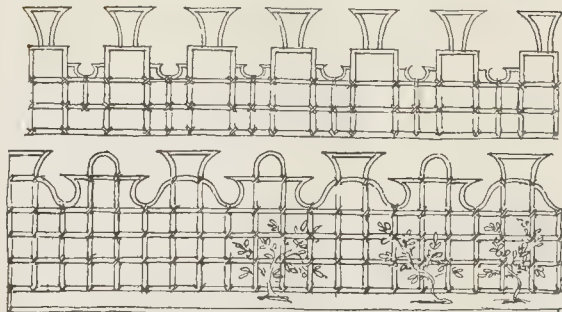
In garden fences the laths are sometimes interlaced, but more usually they are laid across each other, and pinned together in squares or diamonds. Other variations are obtained by doubling the lines of the pattern, as shown on some of the examples before you.

When, however, in verandahs and porches, for instance, other geometrical forms are needed, they are made up of circles, curves, and radiating bars, mostly put together in sections, though some of them are cut out, and form a species of fret-work.

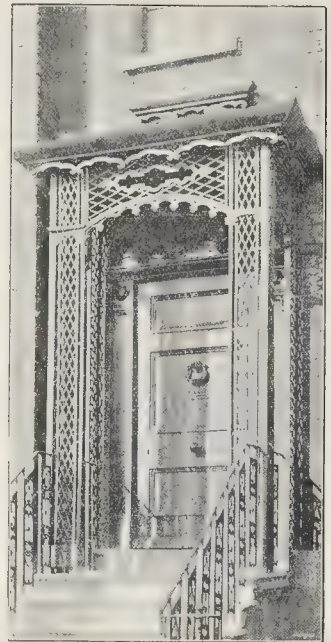
Instead of the ordinary thin lath, strips or fillets of greater thickness, ranging from $\frac{1}{2}$ in. by $\frac{1}{2}$ in. and upwards, are used when the pattern is very



From "The Gardener's Labyrinth."



From Markham's "Country Farm."



A Treillage Porch.



Rose Garden
ENDALL'S MANOR

Illustrations to Mr. Belcher's Paper at the Architectural Association.

open. The columns at 17, Grove End-road, N.W., are constructed in this manner, as are those in Example No. 20, but in other examples the columns are formed of laths on rings, in which case a centre post is necessary. No. 20 is an example in which a thin lath is twisted round the column. It is not only graceful, but serves to bind together the sheaf of laths.

The porch in Example No. 19 is a typical one, showing the curved and interlacing circles. It is put together in pieces with brads. I have figured the sizes of the several parts. Other devices I have mentioned, such as the use of turned wooden balls or reels are used to separate the constructional posts from the smaller pieces between them. They are well shown in No. 9, and also in Nos. 1, 6, 8. In Example No. 2, instead of the ball, the division is made with square fillets.

The "ball" is also used as a fringe ornament as in Example No. 10, and is easily nailed to the soffit.

In Example No. 6 a three-quarter circular rod has been cut up into inch lengths, which have been fixed under the fascia as a kind of dentil course. Square dentils are also frequently used, as they are easily bradded on the cornice.

In many of the best examples of verandahs, we may note that the constructional timbers are reeded, or treated with a hollow moulding to secure a light appearance. Small reeded columns are not unusual, as in Examples No. 4 and No. 10, and indeed form a very characteristic wood treatment of the period. The caps to such columns also are interesting, and some in form resemble a mushroom button, as in Example No. 18.

In Example No. 16, which is taken from Weale's "Carpentry," published in 1852 (a book which contains examples from Brighton), the details of the construction are given.

In trellis designs it is the solids and voids which must be taken into consideration. How admirably this has been calculated in No. 6. The dentils and the valance, &c., stand out against the black void.

Garden seats with trellis work backs were very general in the last century. The backs, and sometimes other parts, were arranged in panels very similar to those on balconies. Such seats have been reproduced in many forms by Mr. Marcus Stone in his pictures. They are so excellent in design and so ornamental to the garden that a revival of the treatment may well be advocated.

It would no doubt be generally difficult to supersede the imitation rustic seats in cast-iron and other cheap forms of garden seats; but for special positions, and particularly where a circular seat is required, place should be found for the work in wood. There is a good seat designed by Mr. Blomfield, which he has kindly lent me with other drawings.

In connection with trellage I must not omit to mention the several forms of palisade already hinted at. The earliest decorative one is the example I have taken from Mr. Blomfield's book. Later ones consist of variations of the post and rail, with plain or shaped laths of more or less elaborate design.

Colour was largely employed in emphasising the forms of trellis-work. Green and white, and red and white were the colours in vogue in old work, if we may rely on tapestries and the painters' accounts preserved.

When, however, oak is used in garden-work the delightful silvery-tint it gains with age is valuable. If the work is in deal then the dark green is most effective. For verandahs, &c., the dark green also tells well against a plaster or cement background, but when the brick wall is dark in tone then white or stone colour looks well.

With regard to the further use of trellis-work, which I have hinted at, I might say that amongst other ways in which its use might be developed is in internal domestic work. The staircase affords an opportunity, as instead of the ordinary baluster, some trellis-pattern can be effectively adapted.

There is one on the screen which has been designed from an old example I found in a house in Gloucestershire. And I have also seen beautiful trellis enclosures to the landings on an old staircase, carried up to the ceiling with arches, pilasters, and window openings of quaint design and detail.

Opportunity is also afforded to the County Council for the use of trellis-work in the erection of "band-stands" in the people's recreation grounds. The pavilion designed by Sir W. Chambers is very suggestive and quite adapted to such a purpose. Light ironwork is too brittle, and is easily broken, whereas the wood gives, and

even if a lath is snapped it is more easily repaired than ironwork.

Their garden seats and shelters also afford excellent opportunities for its use.

Doubtless you can call to memory many a quaint and beautiful example of trellis-work in screens, colonnades, verandahs, and porches. Indeed, there are so many still existing in localities now remote and retired, but which were fashionable last century, that it is not possible to produce here more than a few typical examples.

It is sad to think that when these interesting neighbourhoods come to be opened up for so-called improvements, red brick with terra-cotta trimmings will be substituted for the houses and their contemporary trellis-work.

If only we might return again to the simple brick or plaster front without an ounce of unnecessary detail, but decorated with some festive little trellis balcony or porch, how refreshing it would prove, and would be less costly and quite as lasting.

A well-designed piece of trellis-work gives to the substantial building to which it is attached something of that grace which is lent to garden architecture by the natural growth of creepers.

I know that much more might be said, and better said, in favour of trellis-work and its more extended use, but I hope I have said enough to rouse your interest in it, and that the examples I have brought to your notice at least warrant my drawing attention to the subject of trellage.

Mr. J. M. Brydon said he had much pleasure in coming down that evening to listen to a paper written by a man who had thoroughly studied the subject. There had been very little written on this matter, and the only really good examples one could find when one came to study it, were in the old houses which Mr. Belcher had pointed out, and which were unfortunately too rapidly disappearing. Mr. Belcher had referred to what had been done in Mr. Alma Tadema's garden, though it was not done for Mr. Tadema, but for Mr. Jas. Tissot, the French painter, who owned the place at the time, and was the result of that artist's love of eighteenth-century English architecture. The work was made up of bundles of sticks, and the secret was in the proportions and details, the whole effect being gained by light and shade. The work itself was mainly founded on some of the old work still to be found in Euston-square, and on an old house in Cumberland Market. He thought that a good deal more could probably be made of this kind of work than appeared at first sight, but it was not every client of theirs who had the inclination to cut up his garden, because the feeling generally was to make as much as possible of the little space available in a London back-garden. In the neighbourhood of St. John's Wood, of course, gardens were larger, and there were better opportunities for the use of trellis-work, and in the case of the garden in Grove End-road, the idea in view was to provide, if possible, backgrounds for Mr. Tissot's paintings. It was almost impossible now to buy an old garden-seat, and he had applied to all manner of people who had designs in their catalogues, without effect. The only way to get one was to set to work and design it. He was rather astonished, too, in these days of revival, that the old garden-seat had not been revived. If someone would only take the trouble to work up the designs, there would be a good demand for them, as nothing could be more atrocious than the curved iron seat, and there was certainly nothing more uncomfortable to sit on. The paper they had heard that evening came from a man who, it could be easily seen, had studied the laying-out of gardens in a loving spirit, and that was the great point, for if one only loved a subject it was sure to come right in the end. The arrangement of decreasing the width of the garden path so as to give the idea of distance, was an ingenious one, and in a small garden a little trick of that kind might be indulged in to improve the effect and increase the distance. Mr. Brydon concluded by proposing a vote of thanks to Mr. Belcher.

Mr. A. S. Tayler, in seconding the vote of thanks, said he had been exceedingly interested in the paper. He had often looked at trellis-work, and thought how old were some of the forms which were used. He remembered hearing a lecture on Egyptian architecture at the Royal Academy, which was illustrated with belvederes or verandahs similar in form to those on the screen. The lecturer on that occasion pointed out how common that description of work was in Egypt at one time, but how fast the trellis-work was disappearing from that country. Several Egyptian screens were to be

seen in the South Kensington Museum, which were well worth studying. He believed that the dryness of the Egyptian climate had preserved them, and it was very interesting to find examples of so great an age.

Mr. F. T. W. Goldsmith (Hon. Sec.) supported the vote of thanks. He would ask Mr. Belcher to add to his kindness, after the vote of thanks had been passed, by informally taking them round the room and explaining the many interesting examples exhibited on the screens.

The Chairman, in putting the vote of thanks to the meeting, said it was extremely pleasant to be introduced to so homely a subject. It would increase their interest in walking through many of the old districts of London and its suburbs, and specially following out the observations which Mr. Belcher had so happily made. To see beauty in common things was, he considered, part of the functions of an architect, and the suggestion just made by their Hon. Sec., to ask Mr. Belcher to explain the drawings he had brought with him, was an admirable one.

The vote of thanks was then put, and carried by acclamation.

Mr. Belcher, in replying, remarked that he was not altogether surprised to find that there had been little discussion on the subject that evening. When he volunteered to read the paper, he thought it would be exceedingly easy to find a great deal already written on the matter, but to his astonishment, he found there was absolutely nothing available. He was aware of no work upon the subject, and even those who had to lay out gardens knew next to nothing about trellis-work. He was not surprised, therefore, at his remarks not being criticised more freely. Mention had been made about the Egyptian work, which was fast disappearing. It was vanishing so fast a few years ago, that a law was passed prohibiting the sending it out of the country. A great deal had been sent over here, but, being recognised as a decorative material, they had finally to stop its deportation from Egypt. He thanked the meeting for the attention they had given to his paper, and proceeded then to explain the details of the drawings.

ARCHITECTURAL ASSOCIATION: DISCUSSION SECTION.—The twelfth meeting of the Session of the Discussion Section of the Association was held at the rooms of the Association, 56, Great Marlborough-street, on Wednesday. Mr. W. Henry White, A.R.I.B.A., occupied the chair, and the paper of the evening, entitled "The Queer Side of the Profession," was read by Mr. F. T. W. Miller, A.R.I.B.A. The discussion was opened by Mr. Sheridan, and continued by Messrs. Greenop, Satchell, and Brodie. Mr. Searles-Wood, F.R.I.B.A., the Special Visitor, having commented upon the paper, votes of thanks were passed to the author and to Mr. Searles-Wood, and the meeting adjourned.

MR. T. G. JACKSON ON ARCHITECTURAL PRACTICE.

THE following is the substance of the speech made by Mr. T. G. Jackson on the occasion last week of the opening of the Liverpool School of Architecture and Applied Arts, as reported in the *Liverpool Daily Post*:—Mr. Jackson, in the course of his remarks, said there were associated with architecture two vital misconceptions. The first was that architecture was mere ornamentation—something that was only skin-deep, and a matter of expense merely. The second was that it applied only to town-halls, churches, and the like, and not to ordinary buildings, in the same way that a carriage and pair or a footman and butler were out of the reach of ordinary people. If those ideas were true, architecture would not be in the true sense an art at all; it would not be art applied, but misapplied. But these ideas were wholly false. Architecture was not the art of tricking out a building with ornamentation; it was the art of building well, and, at the same time, building beautifully. It was nothing but good construction, inspired from first to last with artistic motive. Ornament was not a necessary part of it; often ornament was far better left out, for ornamentation was the last resource of the incompetent architect. As one of their own professors had put it, when a man could not design, he fell back upon ornament. Nor was expense a necessary part of it. Many of our buildings would have been better if less had been spent on them. On the contrary, no building was too humble for architectural treatment, and architecture was no more a luxury than was

virtue. The true architect built plainly where it was necessary, splendidly where there was need for dignified expression, but always basing design upon construction, always adapting effect to the occasion, and by cheerfully obeying constructive necessities from first to last, shaping and adapting forms suggested by construction into beautiful and harmonious combinations. Thus architecture inspired building with the artistic motive from the laying of the first brick to the driving of the last nail. How was the good architect to be made? A true artist worked unconsciously, in a good way, and produced a good thing. They might set another man to do the same thing but the result would not be beautiful. The artistic instinct was born with a man. There were those who had none of it; others, most of us, who had enough to enjoy the works of artists; others who had the instinct of beauty so strong within them that they could not help giving it expression either in literary composition, or music, or by what were called the fine arts. But though a man might be born with this instinct it was worth little without study and instruction. A man might be of the right material to begin with, but training was necessary to enable him to use his gifts, and to shape him into an artist. These considerations appeared to him apposite on such an occasion as that then present. Their school was an experiment, an interesting experiment, the result of which would be waited for with anxiety; but, experiment though it might be, experience was not to be overlooked by those who had the direction of it. In this connexion he desired to refer to the comparative values of training architects by the apprenticeship system, which in their case still survived; and by scholastic teaching. He laid stress on the former. There was nothing like real work, the practical work of an office, for enabling a youth to acquire knowledge with rapidity. But although he held that no school training could be substituted for apprentice training, he was far from saying that the latter could give the student all he would require for his career. It needed to be supplemented in a thousand ways, which the student must discover for himself, and such a school as that would be of infinite service to him. One of the results of the modern method was that it shut up the student in the architect's office. This isolation of the architect was a matter of comparative recent date. In former days it was not so. If they wished to know how the great masters of old accomplished their art, they must picture to themselves a very different system to that which was in vogue to-day. They would not find, as now, the architect sitting in his easy-chair in his private office receiving his clients, and surrounded by his clerks and draftsmen; but a much humbler picture would have to take its place. They would find the architect with his tools in his hand amongst his own workmen, and in his shirt-sleeves, providing he possessed a shirt. These old masters were nothing more than workmen, for they not only designed the work for their assistants, but also worked manually in bringing that work to a successful completion. Thus, whereas the modern architect resembled the professional man, and designed his buildings on paper, and only visited the scene of operations from time to time the old architect lived on the building, and designed it with his own hands. The advantages of the old method over the modern were obvious, since architecture and sculpture depended upon the right use of material no less than a right principle of design. Under the present system the architects were too often more in the position of learners than of teachers. They had workmen under them who knew how to do work better than they themselves did. They had to design without ever having held an instrument in their hands. The consequence was that they often set men to do things in difficult and roundabout ways, which might have been done much better. All this resulted from the fact that architects were trained on paper, and as long as they were so they could not hope for anything better. It was important that they should face the fact, and see what could be done to remedy it. If every young architect were made to spend a year or more in a mason's yard working as a mason, original ideas would be formed which could not be got in any other way, and this would save him from those mistakes in the construction of material which so disgraced the modern practice. He hoped this would form part of their work at University College, or that arrangement could be made with master builders to open their yards and workshops for the reception of students, and he trusted those master builders and members of the Building Trades' Federation

who occupied seats on that council would give effect to the suggestion he had made. There was another evil in shutting up students in an architect's office, and that was that it kept them away from the study of the sister arts. The consequence was that, when occasion arose, it was impossible for artists acquainted with each other to produce harmonious results. Architecture was the art of building on a grand scale, as sculpture was the art of building on a small scale, and of all the arts these two were the least separable. It was most essential, therefore, that these two should be trained alike, and a happy consummation attained as in the older times, when the same man could work in each. There in that school they had a ready remedy, for they proposed to carry on instruction in the three great arts, and they might thus easily gather the students together. It was necessary that every architect should pass through the modelling-school, where he would learn to accomplish in concrete form what was to be done in buildings, and in the same way he would have every young sculptor trained in the school of architecture, so that he might learn to deal with work on a large scale, and that which lay more in the field of architecture than sculpture. It was not, however, only to the sculptor or to the painter that they would throw open their school of architecture, but he trusted that it would be open to all concerned in building, of whatever degree. It was essential that builders should take some architectural training in order that their work might be turned out in good taste, and he trusted that the students at that school would be largely made up of builders as well as of architects. In conclusion, Mr. Jackson said the scheme which the Liverpool School of Architecture and Applied Arts had in view was one which every true son of art would from his heart wish a successful issue, and which, if it succeeded, could not fail to have an abiding influence on the history of art in England.

Illustrations.

COMPETITION DESIGN FOR CHRIST'S HOSPITAL, HORSHAM.

THE general perspective view of Mr. T. G. Jackson's design for the proposed new Christ's Hospital Schools at Horsham, of which we give an illustration, hangs in a central position in the Royal Academy Architectural Room.

In explanation of his intentions in the design Mr. Jackson sends us the following extracts from the report which accompanied it when the competition drawings were sent in:—

"I have in the arrangement of the plan been guided largely by the four considerations:—

1. That every block of building in which boys are housed should be lit and ventilated by windows on both sides.
2. That every part of the school buildings should be accessible under cover from every other part.
3. That no block should be farther than four or five minutes' walk from any other block, measured from door to door.
4. That all the boys' rooms should be commanded by the masters and matrons.

The effect of the first of these conditions on the plan is to draw out the boarding-houses into rather long and narrow buildings, which it was not at first sight easy to bring together into a compact form so as to satisfy the other conditions. I believe, however, I have succeeded in doing this by grouping the fourteen boarding-houses round two large quadrangles, and connecting them by means of a continuous cloister or covered walk, which affords dry communication to every part of the building. The two points most remote from one another are the headmaster's house, and the group of houses, Nos. 12, 13 and 14, but the distance is less than five minutes' walk, even round by the cloisters the whole way, and not much more than three minutes across the quadrangles. The axis of the building lies south-east and north-west, the main front facing south-east. This position secures the greatest amount of sunshine to every part of the school buildings, and as the buildings are narrow, and lit on both sides, every part will get the sun on both sides during some part of the day.

The great hall is approached directly from the great quadrangle by a short corridor 20 ft. wide. It is in length, width, and height a reproduction of the great hall in Newgate-street, and I propose to use again the old roof, the wall panelling, the

pulpit, the organ, and any other features of interest that can be removed, so as to preserve the memory of the old home of the School in London.

The class-rooms are arranged close to the great hall and around it, and vary in size. The dining-hall, like the great hall to which it corresponds on the opposite side, is approached by a short corridor 20 ft. wide from the main quadrangle.

It will seat 820 boys at the dining-tables and between thirty and forty persons at the high table, and allow room for carving and serving tables in the middle.

The kitchen is an octagon, 60 ft. in diameter, occupying the centre of a court of its own and surrounded by its offices. Four covered ways lead from it to—

1. The great dining-hall.
2. The junior dining-hall.
3. The dining-rooms of masters, matrons, and the school servants.
4. The quarters of the kitchen servants, and the offices and stores of the steward and cook.

The whole school and its staff of masters and servants can thus be served conveniently from a single centre with great economy of labour.

The whole of the heating apparatus and hot-water service, also, is worked from the same centre.

I have tried to make the chapel simple and dignified and worthy of the great school it would serve.

A large ante-chapel, with transepts at the west end, will afford ample space for monuments of distinguished scholars. The organ is placed in a chamber over the cloister on the south side close to the choir. A side-chapel or aisle on the north contains 104 sittings for adults, and the whole number of sittings is 1,006. The roof and ceiling would be of oak, and also the seats."

DESIGN FOR HEADING OF PROGRAMME.

THE drawing from which this illustration was made, was drawn by Mr. Holiday for a heading to the programmes of concerts of the "Musical Guild," a society formed in 1887 by students who had finished their course at the Royal College of Music. The figures, as will be seen, represent the nine Muses.

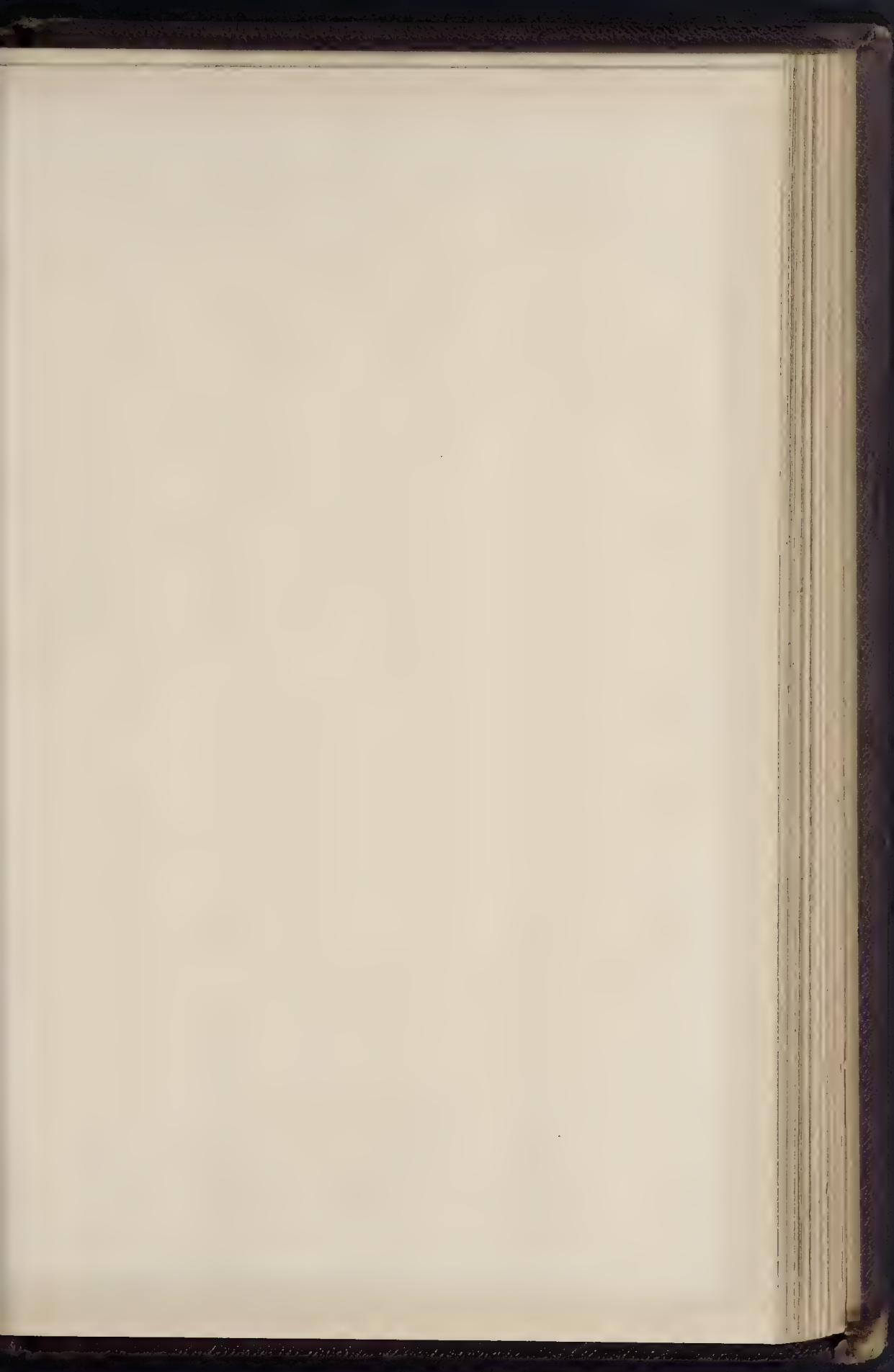
We presume that the drawing was intended to be considerably reduced for the purpose of the programme heading; we give it simply as a decorative design. In the original drawing the words, "The Musical Guild" appear in the centre space left by the framework lines; but in these words, on a very large scale in this reproduction, seemed rather too obtrusive and have no obvious meaning in the design as reproduced here, we have used the space instead for the general title of the design, which sufficiently explains its object.

DESCRIPTION OF NEW CHURCH OF ST. ETHELDREDA, FULHAM, S.W.

THIS church, which is to be proceeded with, in all probability, very shortly, is to be erected in the Fulham Palace-road. It is to seat 850 and to cost about 8,500l. The materials are red brick and stone dressings, &c., in the chancel, and a combination of these two with stock-bricks in the nave. This latter portion has a clear span of 38 ft., 48 ft. being the total internal width. For the sake of economy, combined with the greatest effect, the chancel is raised considerably, and the space underneath utilised for vestries, heating-chamber, and small chapel; the floor-level of these being about 2 ft. below that of the nave. The roofs are constructed with stone ribs, and the vaults between these with coke-breeze concrete plastered on the under side.

A. H. SKIDWORTH.

ROUNDWOOD PUBLIC PARK, WILLESDEN.—On Saturday last Mr. R. D. M. Littler, O.C., C.B., opened Roundwood Public Park, Harlesden-lane, Willesden, the first open space acquired by the Willesden Local Board. The park has an area of 26½ acres, and has been laid out with much taste by Mr. O. C. Robson, Engineer to the Urban District Council. At the entrance from Harlesden-lane wrought-iron gates have been erected, and just within are the new lodge and drinking fountain. A portion of the ground has been set apart as a gymnasium. All the work, with the exception of the gates, has been carried out by labour employed by the District Council, without the intervention of a contractor.







CHRIST'S HOSPITAL.

DESIGNED BY
N. A. E. COMPTON

JUNIOR SCHOOL

HOUSE B PATRON HOUSE C

CLASS
HALL
CLASS

NORTH

THIRD COURT

HOUSE 13 PATRON HOUSE 14

SECOND COURT

HOUSE 7 HOUSE 8

SERVANTS OFFICES

ATTEND

SENIOR
DINING HALL

CHAPEL

HOUSE 6 HOUSE 5

FIRST COURT

HOUSE 4 HOUSE 3

HOUSE 21 HOUSE 2

LIBRARY MUSEUM

CLASSROOM

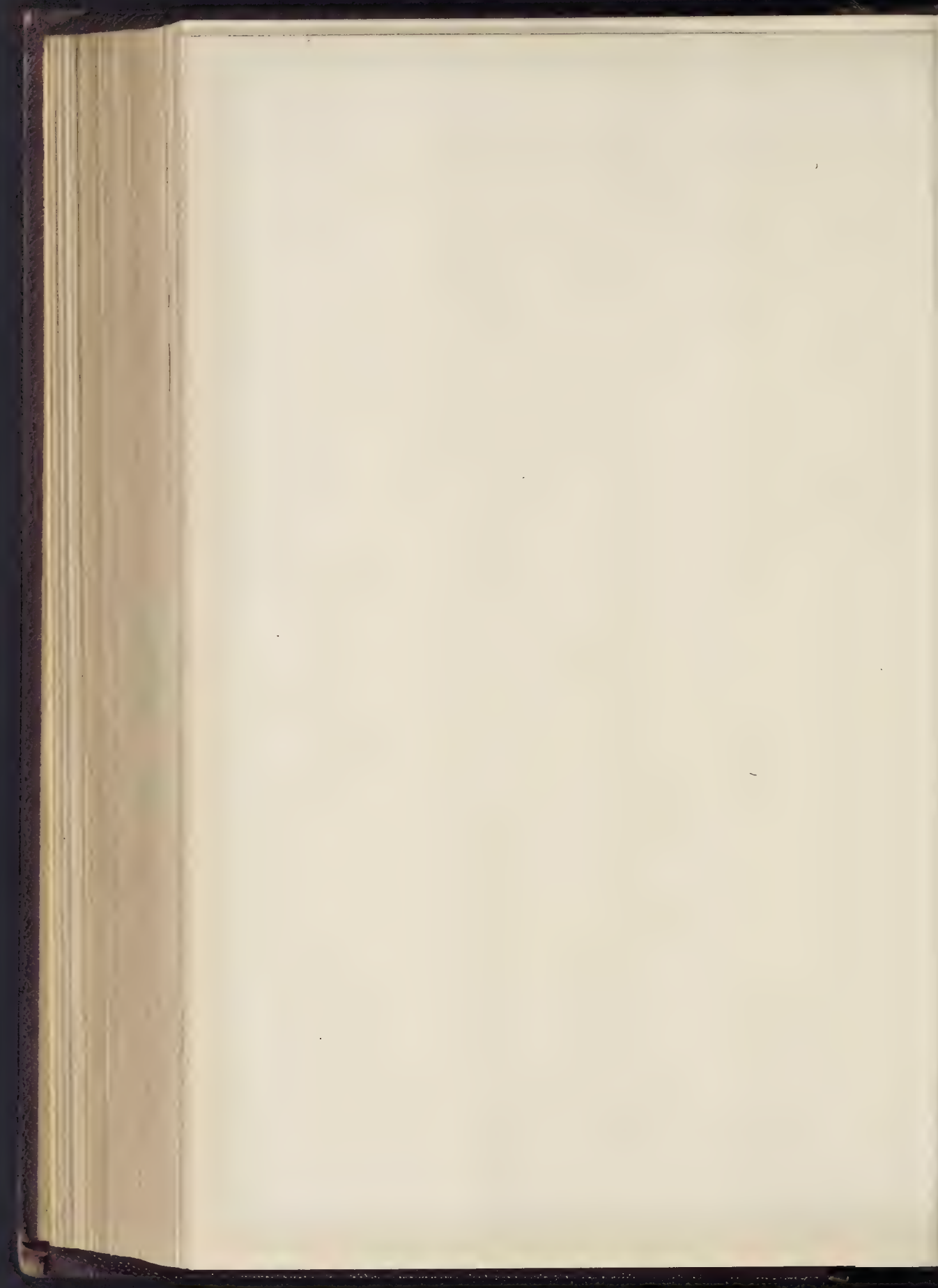
ORATORY

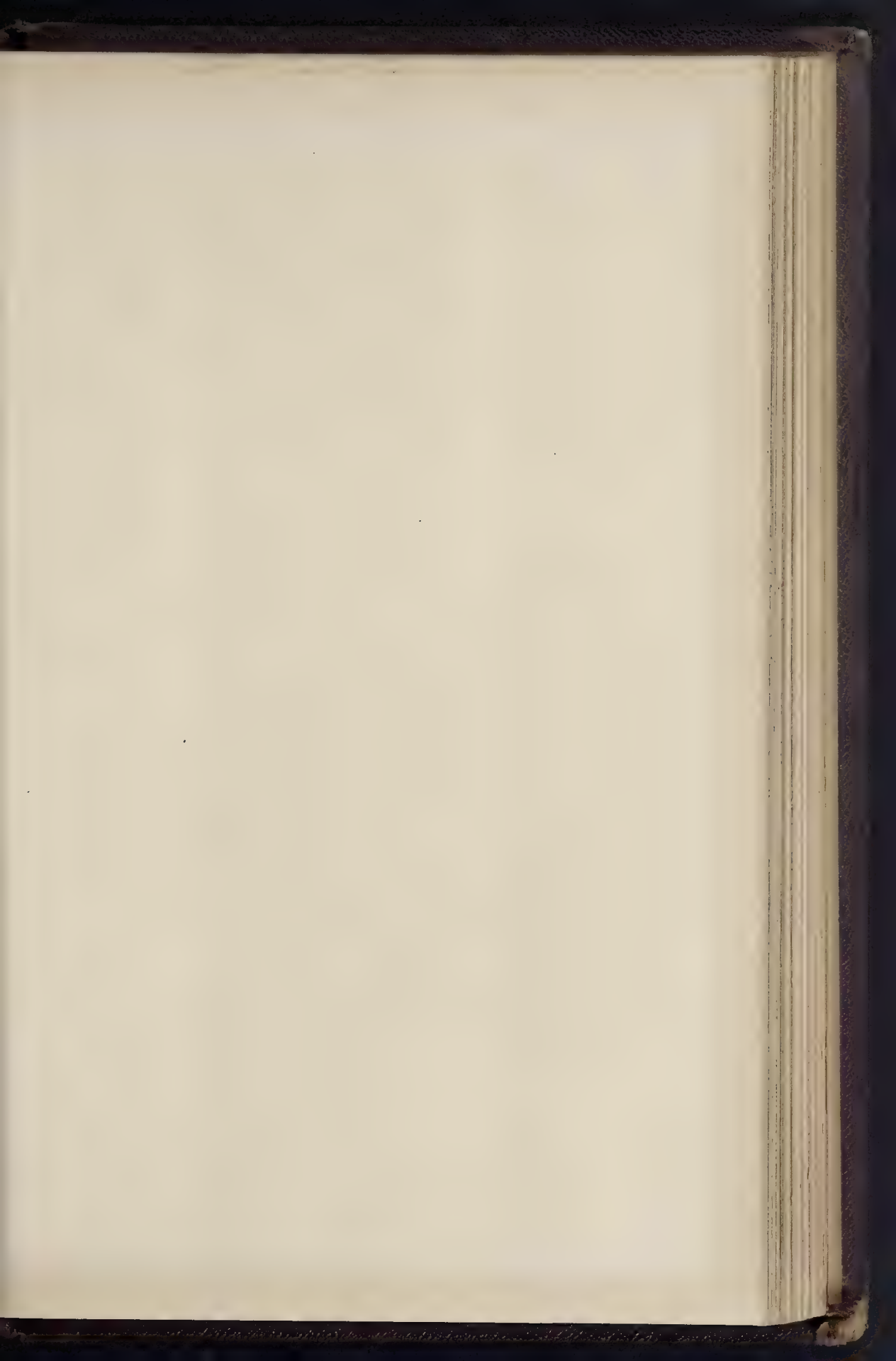
SCHOOL ROOM

CLASSROOM

HEAD MASTER

Handwritten notes and signatures at the bottom right of the page.





NEW CHURCH OF SEETHELPREDA: FULHAM?



View from the west.

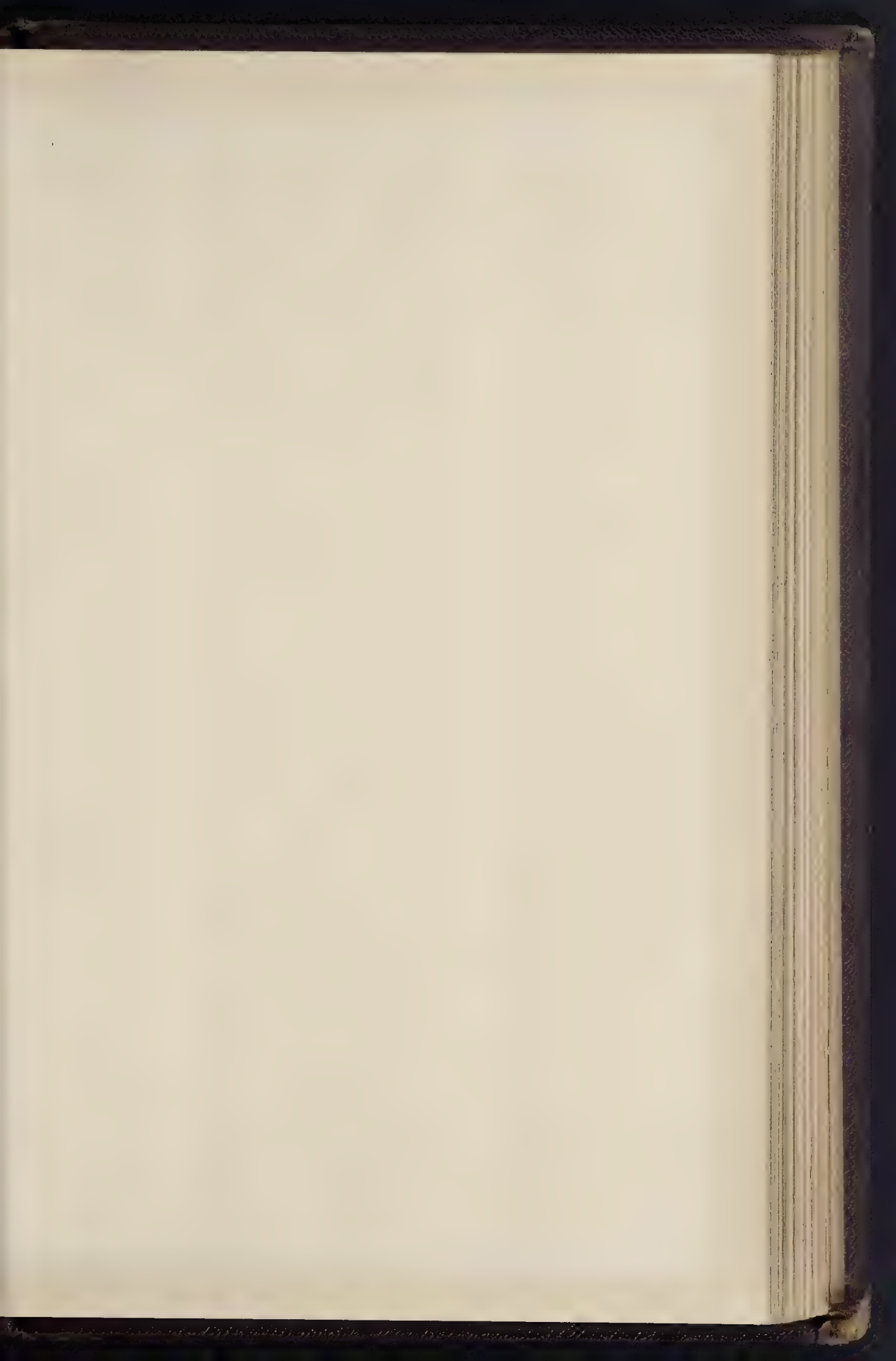
J. P. St. George, architect.
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.



NEW CHURCH OF
ST. ETHELRED
ELLHAM : SAW :

*See sketch of plan
in paper - London -*







DESIGN FOR H

"MU

MR



PROGRAMMES

LD "

DAY.

INCORPORATED ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.

A SOUTH WALES district meeting—the first held in the Principality—of the Incorporated Association of Municipal and County Engineers, was held in the Council Chamber of the Town Hall, Cardiff, on the 11th inst. The Mayor of Cardiff (Ald. P. W. Carey, J.P.), presided at the commencement of the meeting, and amongst those present were the President (Mr. A. M. Fowler, Manchester), Messrs. J. T. Eayes, West-onwich; A. T. Davis, Shrewsbury; R. Redfrey, King's Norton; Hawkings, Somerset; Hall, Cheltenham; Bradley, Nelson; J. Parker, Nottingham; Harper, Newport; Thomas, Neath; and others.

The Mayor, in welcoming the members of the Association, said that welcome was accentuated by the fact that the President (Mr. Fowler) was connected with Cardiff forty years ago.

Mr. W. Harpur, M.Inst.C.E., Borough Engineer, then read a paper on the development of Cardiff. He said the population of Cardiff in 1871 was 56,911, in 1881 82,671, in 1891 128,849, and in 1895 155,637.

The increase of the last ten years was 60·39 per cent. When he first became connected with municipal work at Cardiff, 19 years ago, the total length of highways repairable by the Corporation was 32 miles; the length now repairable was 97 miles. During the past ten years private improvement works had been executed in 268 streets, having a length of 29½ miles, at a cost of 103,710*l*. He ventured to assert that there was no town of equal size in the United Kingdom which, during the past ten years, could show such activity in the building trade as that of Cardiff. In those years 190 new streets, 4,737 new houses and shops, 56 places of worship, and 17 new schools, had been built. Upon these figures Cardiff claimed to be the most rapidly-increasing town in the United Kingdom, and to rank amongst the most prosperous towns in the world. During the ten years the sum of 1,701*l*. 14*s*. 11*d*. had been expended upon sewerage works in the borough. Sanction had also been obtained to the borrowing of 16,500*l*. for enlarging sewers, and the works would shortly be commenced. In the matter of public street improvement works of various kinds, in addition to those especially referred to, the Corporation had, since 1883, expended the sum of 88,565*l*., and in the Cardiff Corporation Act, 1894, they had power to execute twenty-seven road, street, and bridge improvements, and to borrow the sum of 15,000*l*. therefor. In addition to the erection of the Clarence Bridge over the River Taff and the James-street Bridge over the Glamorganshire Canal in connexion with the same scheme, the Corporation had in the past ten years expended a less sum than 41,673*l*. in constructing, widening, and improving thirteen road bridges crossing under or over the various railways in the borough. Nothing perhaps pointed more conclusively to the marvellous development of the town than the necessity for so large an expenditure on the bridges of the various railway companies, converting what were either dirty cattle leaps or common parish road bridges of 25 ft. or more span into bridges more in accord with the requirements of the traffic and more creditable to the general appearance of the town.

The Clarence-road bridge was so named in honour of the late Duke of Clarence performing the opening ceremony on September 17, 1890. Prior to the construction of this bridge, the traffic of that part of the borough was conveyed over the River Taff by means of a private bridge, the property of the Penarth Harbour, Dock, and Railway Company. By the powers of the Act of Parliament under which this bridge was constructed, the Company were entitled to collect tolls from all persons using the bridge, but for many years after its erection the tolls collected could not have amounted to the wages of the toll collector, and in consequence the public were allowed the free use of the bridge until the spring of 1896, by which time the tolls would return a handsome revenue. In the meantime a large number of workmen's cottages had been erected on the western side of the river, the owners being totally in ignorance of the possibility at any time of the imposition of a toll for crossing the bridge. Upon the toll being first imposed, the public using the bridge were greatly annoyed, and refused to pay the demand, and being the law into their own hands on two occasions broke down the gates and threw the toll collector's lodge into the river. The Corporation endeavoured to intercede and to make redress to a company for the purchase of the bridge as

public property, but failed in their negotiations, upon which it was determined to seek powers for the construction of a new bridge, which they did in the next Session of Parliament, and in 1887 obtained an Act authorising the construction of the new roads and bridges. The works comprised the formation and construction of about two-thirds of a mile of new roads 50 ft. wide, half-a-mile of roads 40 ft. wide, a bridge over the River Taff 464 ft. long, and one over the Glamorganshire Canal 104 ft. long, which formed a better and more direct communication between the commercial part of the town in the neighbourhood of the Bute Docks, and the rapidly-increasing suburbs of Grangetown and Canton. The Clarence Bridge, spanning the River Taff, comprises a central swinging-span of 190 ft. 8 in., providing two openings each of a clear width of 72 ft. for the passage of vessels navigating the river, and two end fixed spans each 132 ft. from centre to centre of end piers. The foundations of the abutments were carried down to a depth of 6 ft. and the piers to an average depth of 12 ft. below the lowest point in the river bed, and were obtained in the case of the abutments by the use of close-timbered excavations, and for the piers by the use of wrought-iron caissons, sunk into the gravel by excavating from the inside. A ring of masonry was built upon the caisson as the sinking proceeded, and when the required depth was reached the bottom was carefully levelled and the whole filled with main concrete; the caisson the forming part of the permanent structure. The central pier upon which the swinging-span is supported, was on completion subjected to a test load of 1,000 tons of iron rails. This load was 30 per cent. more than the calculated maximum weight that the pier had to support, and the result was very satisfactory, the pier sinking at the most only five-sixteenths of an inch. Timber dolphins were placed up and down stream to protect the ends of the bridge when open from collision with passing vessels. The abutments and piers were built of Pennant stone, having string-courses, copings, and bed-stones of grey Cornish granite. The superstructure was of mild steel, with the exception of the longitudinal flooring girders, diagonal bracing between same, buckled flooring plates, and parapets which were of wrought-iron. The 12-in. channels, the diagonal ties, and the 10-in. links forming the flanges of the main girders were rolled by the Steel Company of Scotland, while the remainder of the steel was supplied by the Steel Company of Staffordshire. An interesting fact in connexion with the manufacture of the steel eye-bars forming the diagonal ties in the main girders was that the builders found it more convenient to have the heads forged on them in America, than to get the work done in this country, the bars being shipped direct from the rolling-mills in Glasgow to New York and back by way of Liverpool. The bridge is 40 ft. wide from centre to centre of parapets, and consists of a carriage-way, 24 ft. wide in the clear, and two footpaths supported on cantilevers on the outside of the main girders, each 8 ft. wide. The whole weight of the swinging span, upwards of 500 tons, rests entirely on the centre piers, not only when the bridge was swinging, but also when closed and ready to receive the road traffic. It was believed that this was the first swing-bridge constructed upon this principle in the United Kingdom, the usual method being to raise the ends of the span by cams, wedges, or other mechanical device, so as to bring the main girders into the condition of stress obtained in a continuous girder resting on three supports. The bridge was designed to carry the heavy traffic of the neighbourhood, such as a load of thirty tons on a four-wheeled trolley. The cost of the undertaking was £53,150*l*. Mr. Harpur then proceeded to describe the St. Mary-street Market Hall, which has been constructed at a cost of 17,061*l*., and which was opened by the Marchioness of Bute on the 8th of May, 1891. As in other public matters Cardiff had not been behind in providing itself with the electric light. A provisional order was obtained by the Council in 1892, enabling them to provide the requisite buildings, machinery, and plant for the supply of electrical energy to any part of the borough. In the matter of electric plant he was assisted by Mr. W. H. Massey, C.E., who acted throughout as consulting engineer, and to him must be given any credit due to the efficiency of the plant and machinery, and to the excellency of the whole system of electric lighting. The system adopted was a high-tension alternating current system, with rectified current for the street arc lamps. There were at present three boilers in position of the Economic Marine type, constructed for a

working pressure of 160 lbs., and made by Messrs. D. Paxman & Co., of Colchester. Four engines and alternators had been erected to commence with—two vertical triple-expansion condensing-engines, each of 270 break horse-power, and running at a speed of 133 revolutions a minute, and two of the vertical compound condensing type, each of 65 break horse-power, running 200 revolutions a minute.

The engines were by Messrs. D. Paxman & Company, and were supplied through Messrs. Siemens Bros. & Company. The condensing plant had been supplied by Messrs. J. Watt & Company, of Birmingham, and comprised a surface condenser having 1,000 lineal ft. of tube surface, and was fitted with duplex double-acting air-circulating pumps, capable of raising 25,000 gallons of water per hour to a height of 15 ft. Each of the four engines was coupled direct to one of Messrs. Siemens' alternators. The exciters for the alternators were coupled direct to an extension of the armature shafts, so that each direct coupled shaft comprised engine, alternator, and exciter. The whole of the high and low pressure street mains were laid in cast-iron pipes of the concentric type, made by the Indiarubber, Gutta-percha, and Telegraph Works Company, Limited, of Silvertown, London. The current was brought from the station to the town by two high-pressure feed mains at 2,500 volts, and was there transformed by means of six transformers to 100 volts, at which pressure current was supplied to consumers. For the street arc lighting a high-tension feed branch was taken into the basement of the Town Hall, and there transformed down to 600 volts by means of Ferranti transformers and supplied to the street lamps through four-feed mains, each supplying twelve lamps. The lamps are supplied from alternate circuits, so that in case of a breakdown in any arc main or in one of the motors every alternate lamp was kept burning, and was able to maintain a fair light in the streets. The whole undertaking in connexion with the electric lighting had cost about 32,000*l*., and extensions were now in contemplation. The site of the sanatorium was about twelve acres in extent, including two acres now occupied by the temporary structure, and was situated on the Canton Moors, near the western boundary of the Boro'. The buildings were eight in number—the administrative block, two main ward blocks, isolation block, laundry block, stable, disinfecting-house, and mortuary. The wards were erected on the pavilion principle. There were two large wards in each main block, one for males the other for females, each being 60 ft. by 26 ft., and two small wards for special cases, each 12 ft. by 12 ft., and 14 ft. high, the total number of beds thus provided being forty-four. Between the wards in each block there was a nurses' kitchen and duty-room, with inspection-window looking into each ward, so that the nurse has perfect control over the ward from her duty-room. In connexion with the main wards there was a waiting-room and also a bath-room, with two dressing-rooms for discharging patients, which would enable each patient, on being discharged, to leave the building direct from the bath-room. The isolation block was divided into two equal parts by a wall, and the arrangements on one side of the wall were in exact counterpart to the arrangements on the other. Each of the larger isolation wards was 23 ft. by 15 ft., and of the smaller wards 14 ft. by 14 ft., all 12 ft. high, providing accommodation for six beds. The windows, which form the chief means of ventilation to all the wards were divided into two parts by a transom rail about 1 ft. 6 in. down from the head of the frame. In addition to the ventilation provided by the windows hit-and-miss ventilating grids were fixed immediately above the floor level, and Tobin's inlet-tubes about 6 ft. high. Ventilating trunks were fixed in the ceilings, connected to Shorland's extract ventilators on the ridge, for carrying off the vitiated air. Owing to the exceptionally low situation of the site the whole of the floors had been kept 6 ft. above the ground level, and the floors and main walls of the wards were carried on piers and arches, so that there was a through current of air under the floors which would not be liable to be affected by damp. The floors of the wards were constructed of cement concrete, carried on steel joists and finished with oak blocks. The whole of the wards were connected with the administrative block by means of covered corridors. The disinfecting house had two compartments, the one for infected clothing and the other for disinfected articles, and in the walls was built one of Washington Lyons' largest sized patent steam disinfectors. The mortuary was placed at the

extreme south-east end of the site, and contained post-mortem room and pathological room. The buildings were plain in design, faced with Ruabon buff bricks above the plinth level, relieved by red bands and Forest of Dean stone dressings. Space was reserved on the present site for five more main ward blocks and one isolation block, which would provide accommodation for 116 additional patients. The contractors were Messrs. Turner & Sons, of Cardiff, and the cost of the buildings and furnishing would amount to about 37,000*l.*, exclusive of the cost of the land. The Bute-street Police-station was designed to meet the requirements of a very populous district in the neighbourhood of the docks. The building consisted of three stories, and comprised, on the ground floor, the police administrative department, six cells accommodating twelve prisoners, fire-engine shed, mortuary, and dogs' home; and the upper floors consist of a private residence for the sergeant in charge, and quarters for the accommodation of eight single constables. Special attention had been given to the warming, ventilating, and sanitary arrangements. The whole of the work was being carried out by Messrs. W. Thomas & Co., at a contract price of 4,775*l.* The Guildford Crescent bath formed a portion of a proposed scheme for providing the inhabitants of the borough with a complete suite of public baths, consisting of a central establishment, where the swimming-bath would be the chief feature, and a number of subsidiary baths, one in each of the outlying districts of the town, where, together with the provision of a small swimming-bath, there would be an installation of private baths for ablutionary purposes. The establishment consisted of a first-class men's bath in direct communication with the Turkish bath, a second-class men's bath, and a ladies' bath, together with the necessary appointment of ticket-office, attendants' rooms, towel, laundry, engine, and boiler houses, &c. One of the principal features of the bath was the arrangement which had been patented of warm lavatories having dual dressing-rooms in lieu of the ordinary slipper baths, these lavatories being combined with the swimming-bath in such a manner that the bather having performed his ablutions and vacated the washing-bath, could still retain the use of his dressing-room if he still desired to enjoy the luxury of a swim. The heating of the bath-water was carried out on the Kosher system, which provides for the constant circulation and aeration of the water, the temperature of which was maintained at 70 deg. The contractors for the work were Messrs. Symonds & Co., of Cardiff, at a total cost of 12,360*l.* Roath Park is of very recent construction. Until six years ago the valley in which the Park lies consisted of rough pasture and bog land, through which there was not even an occupation road or public footpath, and the marvellous change which had taken place in so short a time was almost inconceivable. The total area of the Park, including the outer roads, was 120 acres. The greater portion of the land was presented to the town by the Marquess of Bute, while smaller portions which intervened and were requisite to complete the scheme were readily given by Lord Tredegar and by Messrs. Clark & Jackson. The ceremony of cutting the first sod was performed by the Marchioness of Bute on August 24, 1887, and was opened to the public on June 20 last by the young Earl of Dumfries, heir to the Marquess of Bute. The land upon which the Park had been formed was situate in the bottom of a valley through which runs a beautifully pellucid and winding brook, providing a splendid supply of water for the lake. The brook inside the fences of the park was spanned by five iron footbridges and by a rustic bridge in the pleasure-garden portion of the Park. The Park was divided into six sections—(1) the recreation-ground comprising an area of 23 acres; (2) the pleasure-gardens of 11 acres; (3) the botanical gardens, 15 acres; (4) the lake section, 41 acres; (5) the wild fowl garden, now in course of being laid out, 8 acres; (6) the oval, yet to be formed and laid out, 2 acres. The remainder of the area, making up the 120 acres, is taken up by the roads encircling the Park, and which consist of 3½ miles of road, 40 ft. wide and half a mile of roads 30 ft. wide. In making the excavation for forming the roadway encircling the Park a very fine section of the Silurian stratification was cut through, and said by geologists of repute to be the finest exposed section in Great Britain. One of the chief features of the Park is the lake, half a mile in length, and with a water-surface of 32 acres. The total expenditure on the Park, up to the present, had been 50,410*l.*, and when completed was

estimated to cost 55,000*l.* In addition to Roath Park, the Corporation had acquired the Ely Common, where they were now laying out a park 25 acres in extent, and another similar park on Canton Common having an area of 22 acres. They had also, during the past five or six years, acquired fourteen open spaces, varying in area from half an acre to 3 acres each.

Mr. R. Godfrey, of King's Norton, proposed a vote of thanks to Mr. Harpur for his paper.

Mr. A. T. Davis, of Shrewsbury, seconded, and the President (Mr. Fowler) supported the vote of thanks, which was adopted, and acknowledged by Mr. Harpur.

Mr. J. T. Eayrs (West Bromwich) proposed a vote of thanks to the Mayor and Corporation of Cardiff, which was seconded by Mr. Hall, Cheltenham, and adopted.

The members attending the meeting were then entertained to luncheon in the Assembly-room of the Town Hall by the Mayor of Cardiff, who presided, and was supported by most of the members of the Corporation. He proposed the toast of the President and members of the Incorporated Association of Municipal Engineers, and offered the Association a hearty and generous welcome.

The toast having been honoured, the President responded, and then proposed the Mayor and Corporation of Cardiff, a toast which was very heartily honoured.

In the afternoon, the members attending the meeting visited Cardiff Castle, the residence of the Marquis of Bute, the docks (for which visit a special train was provided by Sir Wm. Thos. Lewis), the sanatorium, the electric light station, and Roath Park.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday, at the County Hall, Spring Gardens, Mr. Arthur Arnold, Chairman, presiding.

The Works Committee and the Cost of Work.—The adjourned report of the Works Committee was then considered. The recommendation of the committee was to the effect that in cases where the actual cost of the works had exceeded the estimates the amounts expended be approved. Several additions were made to this recommendation at the meeting last week, and the following amended motion was now before the Council:—

"That in the cases in which the actual cost of the above works has exceeded the original or amended estimates the amount expended in connexion with the works be approved; and that the Works Committee be instructed to prepare and bring up a report to the Council making suggestions for preventing estimates being exceeded in future, and do also report forthwith the particulars of the jobbing works done during the existence of the Committee, together with the values placed upon such works by the officer under whose orders and directions such jobbing works have been carried out. That the Council, having considered the report by the architect on the statements affecting his department contained in the report of the Manager of Works, finds no reason for attributing to the architect or his department any responsibility for the increased cost of the buildings erected in Yabsley-street and Blackwall-lane."

The Council at once proceeded to divide on the motion as amended, when there voted for the motion, 52; against, 56.

Mr. Boulnois asked what would be the result of the vote.

The Chairman said that the whole of the original resolution, together with the added matter, disappeared, and it would be for the Committee to reconsider their position in view of the fact.

At a later stage of the proceedings, a report of the Public Health and Housing Committee, with reference to the dwellings to be erected on the Boundary-street area, was considered and discussed at considerable length. The Committee reported as follows:—

"We submit the working drawings, specification, and estimate with respect to the superstructure of the block of dwellings proposed to be erected on the Boundary-street area, facing Shore-ditch churchyard, and comprised within Section B of the area. The amount of the estimate is 9,100*l.* We have submitted a statement to the Finance Committee giving the probable receipts and outgoings in connexion with the dwellings, which shows that the Council's resolution of March 21, 1893, requiring a return of 3 per cent. on building operations of this nature, will be met, and an annual balance obtained of 68*l.* 14*s.* 10*d.* The Finance Committee will submit their report concurrently with our report, The

foundations of the dwellings are now being put by the Works Department, and we recommend—

"That, subject to an estimate to be submitted to the Council by the Finance Committee as required by the statute, the work of erecting the superstructure of the block of dwellings facing Shore-ditch churchyard, and comprised in Section B of the Boundary-street area, be executed by the Council without the intervention of a contractor, and that the plans, specification, and estimate be referred to the Works Committee for that purpose."

Mr. Beachcroft moved that all words after the second word "Council" be omitted, and that the following be substituted—"and that tend to be invited by public advertisement."

Mr. Beresford Hope seconded the amendment. Mr. Ward, Chairman of the Works Committee, hoped the Council would not accept the amendment, because the Works Department had already put in the foundations of the buildings.

Mr. White, Vice-Chairman of the same Committee, said he hoped that the Council would state its hand, bearing in mind the losses that had already occurred.

Sir Horace Farquhar said that the Works Department ought not to have more work carry out, unless contractors were allowed to compete.

Other councillors having joined in the debate upon a division there voted, for the amendment 55; against, 65.

The recommendation of the Committee was then agreed to.

Tower Bridge (Southern Approach) Bill.—The Parliamentary Committee reported that they had considered the clause in the Tower Bridge (Southern Approach) Bill, which dealt with the improvement charge on property increased in value by the improvement, with the object, arriving at a compromise which should reconcile conflicting views. They had resolved unanimously to adopt, with that object in view, modification of the "betterment" clause in the Manchester Corporation Act. Their proposal was that "worsement" should be confined to the same area as "betterment," that the right of purchase should be exercised by the owner within three months of the publication of the Council's assessment, and before these expenses had been incurred, and that the provisions for hearing by jury should be abolished.

The Council adopted this compromise as approved of the action of the Committee, requesting Councillors who are Members of Parliament to take steps for the carrying out of the compromise by the Select Committee of the House of Commons.

London Building Act, 1894.—The report of the Parliamentary Committee contained the following paragraph, the recommendation being agreed to:—

"In connexion with a Bill called the Metropolitan Police Provisional Order Confirmation Bill, which is now before Parliament, for the acquisition of certain property for the purpose of enlarging and improving the Tottenham Court-road Police station, our attention has been directed to the 202nd Section of the London Building Act, 1894, which exempts from the operation of the Act 'a building, structure, or work, vested in and occupied by any department of Her Majesty's Government, or of the Metropolitan Police.' We are strongly of opinion that public buildings generally should be made to comply with the requirements of the Act as to lines of frontage, as well as with the general requirements of the law regarding drains and sanitary conditions, in the same way as buildings the property of private owners, and we think that a representation should be made to the Government on the subject, pointing out how extremely desirable it is that these requirements should be observed in the erection of exempt buildings. We therefore recommend—

"That a representation be made to the Government to the above effect."

The Unification of London.—Mr. T. McKinnon Wood moved the following resolution in reference to the unification of London:—

"That the Council do represent to Her Majesty's Government the urgent importance of introducing in the present session of Parliament a Bill providing on the general lines of the report of the recent Royal Commission, both for the amalgamation of the City and County of London, and for the creation of local councils, beginning with those areas which are already suitable as regards size and population."

Mr. Torrance seconded.

Alderman Ritchie moved as an amendment:—

"That the institution in the place of the present Council of a single Municipality embracing the whole of London would entail grave interference with the independence of local authorities, and conduce to efficient administration, and that in the opinion of the Council the interests of good government in London will be best served by strengthening local authorities, and by transferring to them

ch of the powers now possessed by the Council as n be properly exercised by them, and at the same time by considering in conference with the Corporation of the City of London whether certain of the powers now possessed by them should be entrusted to the Council."

Lord Onslow having seconded, the debate was journeled.

COMPETITIONS.

LADIES' COLLEGE, HIGH BARNET.—In the competition for a ladies' college at High Barnet, the designs submitted by Mr. George Jones, F.R.I.B.A., 4, Great Winchester-street, London, E.C., have been selected, and he has been instructed to obtain tenders forthwith. Accommodation is provided for seventy resident pupils, with dining-hall and Principal's house.

CHURCH, SOUTHPORT.—Plans for the erection of a new church in Cambridge-road, Southport, were just been accepted. Seventeen designs were submitted by local and other architects, and those in by Messrs. Preston & Vaughan, of Manchester, have been selected.

DURHAM SEWAGE SCHEME COMPETITION.—A special meeting of the Durham City Council, on the 8th inst., to finally select one of the many schemes submitted to them for sewerage of the city, and the construction of sewage purification outfall works, the first premium was awarded to Messrs. Lomax & Lomax, A.M.I.C.E., 1, Grosvenor Chambers, Deansgate, Manchester, and D. Balfour, M.I.C.E., being awarded the second premium. The scheme submitted by Messrs. Lomax & Lomax is that known as "The International," being the chemical precipitation tanks and filtration through polarite beds.

ARCHITECTURAL SOCIETIES.

EDINBURGH ARCHITECTURAL ASSOCIATION.—The fortnightly visit of this Association, on the 11th inst., was to Paisley, the attractions being the ancient Abbey and the Coats Memorial Church, of which Mr. Hippolyte J. Blanc, R.S.A., was the architect. On arrival at Paisley Abbey, the company were received by Mr. Dr. Gentles, and conducted to the interior of the Abbey, where Mr. Blanc read a paper, in which he described the foundation of the original establishment, its development till it became one of the richest in Scotland, having derived revenues from twenty-eight churches, and the various historical associations in which Royal personages were. It was largely destroyed by fire in 1307, the existing remains were chiefly of the fourteenth and fifteenth centuries. Mr. Blanc pointed out its architectural features, and indicated the character of the complete building before the fire and transcripts came to ruin. Dr. Gentles gave additional information as to tablets, &c., and at the conclusion of the visit he was thanked for his courtesy. The party then proceeded to the Thomas Coats Memorial Church, where Mr. Blanc explained the architectural features of the structure, which has been illustrated in our pages. Mr. Bruce moved a vote of thanks to Mr. Blanc for his services that day, pointed out that one outstanding characteristic of his work had been thoroughness. Mr. n replied, and the party proceeded on their journey.

ARCHÆOLOGICAL SOCIETIES.

SOCIETY OF ANTIQUARIES OF SCOTLAND.—At last monthly meeting of this Society for the present session was held in the Museum, Queen-st., Edinburgh, on the 13th inst., Mr. Thomas Law, of the Signet Library, in the chair. In first paper, continuing his examination of the called Roman roads of the ordnance maps, James Macdonald, one of the vice-presidents of the Society, gave an account of the results of examination of the roads in Roxburghshire, butted to the Romans, and marked as Roman these maps. They were two in number, one also being known as Watling-street, the other as the Wheel Causeway, gave a description of the Watling-street in the English Border to the spot near Boswells, where it is lost in the Melrose Ancrum-road. As regards its history and n, he was of opinion that certain points pointed having in all probability followed the route rally taken by the legionaries when marching North Britain, and to part of its course at having been laid down by the Romans. In case of the Wheel Causeway, however, which is Scotland near the sources of the Liddell

water, he could discover no evidence that the Romans had had anything to do with its formation. It had been a drove road, and nothing more. In the second paper, Dr. Joseph Anderson described the contents of a very extensive refuse-heap accumulated at the base of an isolated stack of rock at Gallanach, near Oban, which seems to have been occupied as a prehistoric fort, and is known in the locality as Dun Fheurain. The pottery discovered was of two varieties—one a coarse, bowl-shaped vessel not unlike the pottery of the Brochs, and the other a small fragment of the red lustrous ware commonly called Samian, and associated with the Romano-British period. Mr. F. R. Coles described the stone circles of the stewardry of Kirkcudbright, which he considered to have been in most instances the base-stones of cairns. In the next paper, Mr. James Curle, jun., the Society's librarian, described three early iron age brooches from the island of Gotland, Sweden. In the last paper, Rev. James Morrison, Urquhart, a corresponding member of the Society, contributed a notice of a sculptured stone of the early Celtic type recently discovered at Easterton of Roseisle, near Burghhead. The Society then adjourned to St. Andrew's Day, November 30 next.

Correspondence.

To the Editor of THE BUILDER.

ARCHITECTURAL ASSOCIATION SKETCH BOOK.

SIR,—Will you kindly allow me to make it known to your readers that I, as Secretary of the Sketch Book, have a few back volumes of the *New Series* still on hand, which I shall be glad to dispose of for the following reasons, *i.e.*—Having completed the *New Series*, it is necessary to close the accounts, and in order to meet the last of our liabilities we desire to realise the only asset we have, *viz.*, some twenty copies in all of the last three or four volumes. I am glad to say that during the whole of the thirteen years over which the *New Series* has spread itself, we have always paid our way, but we cut matters so fine that in order to settle our accounts we must sell the whole of the volumes printed.

I think it is generally admitted that the volumes of the Sketch Book are about the best value for the money that can be obtained anywhere. I therefore trust than when it is known that the sale of the last few copies of the series will enable the committee to send a final cheque to the printer there are many who will feel disposed to lend a helping hand.

LEONARD STOKES.

3, Prince's-street, Westminster, S.W.

BUILDINGS AT BOURNEMOUTH.

SIR,—With reference to the leading article last week in the *Builder*, and apropos of Mr. Wilson's design for St. Andrew, Boscombe, may I make a few remarks? You say that "Bournemouth has been up to the present time at about the lowest architectural level of any town we know of. As far as we can recollect, except Street's church, there is not a decent building, architecturally speaking, in the place." Now, granted that the ordinary run of domestic buildings are, in the majority of cases, thanks to the wretched speculative building system, examples of builders' jerry-building, with a superabundance of would-be artistic external ornamentation thrown in, which, unfortunately, seems to fascinate the eye of the retired shopkeeper from the Midlands, if not one else; at the same time, we cannot afford to have our churches, some of which we are justly proud of, passed over so slightly.

The names of the architects will be sufficient to correct this error.

1. Mr. Pearson's St. Stephen's, with its exquisite stone-groined roof and noble west window, a real gem of beauty, still uncompleted.

2. Street's St. Peter's, a fine church, but not to be compared with the last named.

3. St. John's, Moorndon, Sir G. Scott.

4. St. Clement's, Boscombe, the late J. D. Sedding, with new tower, finished last year from designs executed before his death.

5. St. Michael's, Mr. Norman Shaw.

6. St. Swithun's, the same.

7. Holy Trinity, Mr. A. F. Parken, in Romanesque style, built of brick, with lofty campanile.

8. St. John's, Boscombe (now building), Mr. Oldrid Scott.

G. A. BLIGH LIVESLEY.

May 8, 1895.

* Some of the churches referred to have apparently been built since our last acquaintance with Bournemouth. In that case we admit that we should not have said "up to the present time." We are glad to find the land is somewhat less barren in this respect than we had supposed.—Ed.

THE "ESSEX REVIEW."

SIR,—In your notice of my Paper on St. Nicholas Church, Chignal Smealey, you say: "It would add to the interest of these articles if a general perspective sketch, or a reproduction from a photograph of each church, were given with the article." If you will again refer to the last number of the *Essex Review*, and to all previous numbers, you will find I have given a perspective view of every church, but as the printer generally binds the view up at the commencement of each number you may have overlooked it. FRED. CHANCELLOR.

CO-OPERATION IN ARCHITECTURAL PHOTOGRAPHY.

SIR,—In the hope that there may be some readers of your paper who are interested in this subject, I would venture to ask you to give publicity to the fact that I am forming a club for systematic photographic work in English Church Architecture.

Without going into details I might say that it is proposed to limit the number of the members to twelve, with a circulation of lantern slides (not prints) every other month, illustrating some set subject—*e.g.*, Norman capital, E.E. piscine, geometrical tracery, &c., &c., no member to send in more than six slides at a time, with the privilege of copying any slide sent in, thus affording a very valuable opportunity of constantly increasing one's collection of examples.

If anybody would desire to join this club, and is at the same time a reasonably good worker in photography, I would ask him to communicate with "CHALKOS," 100, High-street, Eton, May 11, 1895.

The Student's Column.

BRICKS AND TERRA-COTTA.—XX. STRENGTH (continued).

IN the year 1848 several experiments were carried out at the Regent's Park Iron Works as to the strength of bricks set in cement, the results of which have not received the attention they deserve. The materials used were practically of the same character as those made at the present day, and we may give the following summary relating thereto:—

The blocks of brickwork were of uniform size, 18 in. long × 9 in. × 9 in. Pressure was exerted on the ends; the power of the press was 75 tons.

1. A block of London stock-bricks, set as a 9-in. pier, with neat Portland cement, thirty days old. Result, the bricks crushed at 15 tons, and the whole broke down at 16 tons. This is equivalent to, at 15 tons, 470 lb. per square inch, or 18.75 tons per square foot. Cement not quite gone.

2. A block of London stock-bricks, set as a 9-in. pier, with Portland cement 1 part, sand 3 parts, thirty days old. Result, no effect until a pressure of 26½ tons was put upon it, when it cracked, and crushed suddenly in the direction of its length. The bricks gave way first, the cement apparently not being much affected. Equivalent to 726 lbs. per square inch, or 33.125 tons per square foot.

3. Brick pier of same kind as No. 2, but set with neat Roman cement, thirty days old. This broke up suddenly at a pressure of 30 tons, no defect having previously been noticed. Equivalent to 829 lbs. per square inch, or 37.50 tons per square foot.

4. Block of London stock-bricks, set as a 9-in. pier, with Portland cement 1 part, sand 2 parts; 52 days old. Result, at 16.875 tons it cracked, and 22½ tons crushed. Equivalent, at 22½ tons to 608 lbs. per square inch, or 39.5 tons per square foot.

5. Block as in No. 4, set with Roman cement 1 part, sand 2 parts; 52 days old. Result, owing to a bad brick having been employed it commenced to break up at 5.625 tons, but was not finally crushed until a pressure of 14.062 tons was exerted. Equivalent, at 14½ tons, to 386 lbs. per square inch, or 25.7 tons per square foot.

Examining these five experiments, we notice that the greatest resistance was 30 tons, and the average resistance 22 tons—thus giving about 600 lbs. per square inch, or 38 tons per square foot, as the strength of brickwork in cement. Owing to the bricks giving way before the cement in each case, and from the general aspect of the results, we imagine that the London stocks used were not of very good quality.

Shortly afterwards another series of experiments of a rather unique nature and of considerable use were made by Messrs. Robins, Aspdin, & Co., from which we select the following. The tests were divided into two groups; in both,

London stock-bricks were employed, only, that in the first group to be mentioned they were of rather better quality than in the second.

Series I.—In this the bricks were in each case attached by a broad side (flat) to a wall, and to each other, with cement, and mixtures of sand and cement, and had stood twenty-seven days with proper supports.

1. Cement : 14 bricks. A heavy weight (about 9 cwt.), was placed on the seventh brick. Result, the substance of the third brick gave way in a few minutes with a small additional weight.

2. One part cement to 1 of sand ; 30 bricks : 8 lbs. weight was placed on the last brick and 7 lbs. more gradually added when that brick gave way in three places.

3. One part cement to 2 of sand ; 22 bricks withstood $3\frac{1}{2}$ cwt. on the 22nd brick, when both bricks and cement gave way.

4. One part cement to 4 of sand ; 25 bricks, weight placed on the last brick ; it gave way under $\frac{1}{2}$ cwt. pressure, some of the bricks breaking.

5. One part cement to 5 of sand ; 26 bricks, weights placed on the last brick until a few bricks broke under 74 lbs.

6. The last experiment of this series differed from the others in that the structure stood for twenty-eight days, whilst it was borne at each end, the weights being attached between ; the span or bearing was 2 ft. 6 in. Cement was composed of 1 part cement to 1 of sand. The bricks broke under a weight of about 15 cwt.

Series II.—As in the previous series of experiments, many of the bricks gave way before the cement. They were built in bars of 5 ft. span laid horizontally, three bricks in breadth and three in thickness, with supports at each end built on sand, and about two lengths of brick in thickness from the outer edge to the inner span. The whole stood for a month before being dealt with.

1. Cement ; the bricks broke across in two places under a pressure of 2 tons 18 cwt.

2. One part cement to 5 of sand ; under a load of 31 cwt. a brick was broken and the cement yielded.

3. One part of Roman cement to 1 of sand ; under a load of 29 cwt. a brick was broken and the cement yielded in three places.

4. One part cement to 3 of sand ; under a load of 47 cwt. the bar split partially in two places, and shortly afterwards gave way.

5. One part Roman cement to 2 of sand ; under a load of 21 cwt. the bar gave way in the cement.

6. One part cement to 6 of sand ; under a load of 24 cwt. 6 bricks out of 9 were broken. This poor result was said to be partially due to an accident the bar had sustained previously.

The following results are derived from tests made at the Great Exhibition of 1851 :—

1. Sixteen stock-bricks attached to each other with neat cement, supported at one end, and projecting from the bearing point 3 ft. 2½ in., broke in the 11th brick with a weight of 25½ lbs. suspended on the extreme end.

2. Twenty stock-bricks, united side by side with cement, composed of 1 part cement to 1 of sand, 3 ft. 6½ in. in bearing, were supported at each end by iron clamps ; the weights being applied to the centre, the bricks broke with the application of a weight of 1,200 lbs.

3. Six fire-bricks, in courses, cemented together with cement only, were suspended, and weights were applied to pull them apart ; a brick in the upper portion broke under a weight of 2,836 lbs.

4. The five remaining fire-bricks from the last trial were again tested, iron being inserted in the second brick from each end ; the bricks broke with a weight of 4,600 lbs.

It may be objected that the above recorded experiments referred more particularly to the strength of the cement used, which was undoubtedly the case, up to a certain point. But they bring out many facts of interest also in respect of the strength, &c., of common house bricks under peculiar circumstances. The cement, no doubt, was of much better quality than the mortar used in the average London building, and the results teach us that the adhesive power of good cement is, like the cement itself, stronger than that of the materials constituting common bricks. Not the least remarkable feature in these tests was the diverse character of the strains and stresses brought to bear on the bricks. There can be no question that by experimenting on the "crushing strengths" of bricks and brickwork, *i.e.*, submitting them to a compressive force, or thrusting stress, as is done in practically all cases at the present day, we see the bricks at their

best. That is but very little index of their behaviour in the walls of ordinary buildings ; some, it is true, are merely compressed, but they are compressed in a more or less confined space in walls, not as between the dies of a machine ; others may be pulled, thrust locally, alternately expanded and contracted, and are subjected to varying forces, especially in tall edifices and chimneys, owing to wind pressure acting laterally. We want more experiments of recent date dealing with the material under these various heads. It would be found, we venture to predict, that the "crushing strengths" so widely scattered abroad, are far in excess of the real strength of the bricks under the varying conditions mentioned ; and we should not be surprised if such bricks as are built in edifices subject to much vibration, either from the motion of machinery or from wind pressure, were found to be completely modified by "fatigue" and rendered weak.

Strength of Terra-Cotta.

As we have previously remarked, experiments to ascertain the strength of terra-cotta have been few in number. This is due to a certain extent to the divers manners in which the material is used, and to the ever-varying thickness of the "walls" of the finished product, circumstances which make it impossible to arrive at more precise information concerning its strength than could be estimated by a rough-and-ready method. The strength of a building block of terra-cotta is frequently that of the concrete core within ; in other words, if through any cause the shell of the block is cracked, the flaw is not of much moment from the constructional point of view unless the core gives way also, which, in most instances, is a very unlikely occurrence. Well-made, thick-shelled terra-cotta, is probably as strong as the best bricks.

Experiments made at South Kensington about the year 1868, and described by Mr. Redgrave, showed that a weight of 20½ tons had been sustained by a column of terra-cotta under somewhat adverse conditions, and from that and other circumstances it was believed that a column, 15 ft. in height and 1 ft. 6 in. in diameter, would carry a weight of 25 tons with greater and more permanent safety than a cast-iron column or core, 8 in. in diameter and 1 in. in thickness.

In a paper read by Mr. Charles Barry before the Institute on June 22, 1868, some particulars were given as to the comparative strength of building stone and terra-cotta, including the results of several tests made with reference to the latter. We quote them as much to show the way in which statistics compiled to prove a certain point are got together, as for the value of the original experiments. Mr. Barry states : "The following table will show the results (of the tests) and will, I am sure, convince architects that we have here a very trustworthy material."—

Comparative Strength of Terra-cotta and Stone.

	tons.
Portland stone stood a crushing strain of	283
Bath	88
Terra-cotta block of similar size	442
Good hard stock brick 9 in. x 4½ in. x 3 in.	17
Terra-cotta block of nearly the same size, or 12 in. x 4 in. x 3 in.	125

From what follows it will be seen that much care was bestowed on the terra-cotta tests, but in comparing these with the strength of brick and stone, as given, it is not fair to take the strength of Bath stone at 88 tons as against Portland stone at 283 tons ; the ratios are very different in dealing with average samples of these two stones, though we admit that, exceptionally, such results have been arrived at. Neither is it quite fair to compare the best description of terra-cotta with one of the worst kinds of brick, as is done in the tests alluded to.

Experiments were made with differently-shaped pieces of terra-cotta, some of them solid, some hollow, but left empty, and some with the hollow blocks filled in with brick and Roman cement. The results showed that the filling in doubled the strength of the hollow blocks, as the one showed signs of cracking with a strain of 42 tons per square foot, and the other required 86 tons to produce that effect. In these two experiments it should be mentioned that the terra-cotta was 1½ in. thick only, whilst the thickness of that commonly used in practice was about 2 in., so that the figures would be considerably increased with the ordinary material. The reason for the experiments being carried out on the thinner description of terra-cotta, instead of on the material as commonly in use at that time, is not apparent.

An experiment showed that a solid 12 in. cube of terra-cotta did not crack until a crushing

strain of 442 tons to the square foot was applied ; and to crush a hexagon stable-floor brick 4 in. diameter and 2½ in. in thickness, required 855 tons. This terra-cotta was composed of mixture of clays from Cornwall, Devon, Dorset, and Northamptonshire, blended and mixed with ground-glass, felspar, Lynn-sand, and pulverised terra-cotta fragments. The pieces experimented upon, which were hollow, were filled with Roman cement twenty-seven days before the trial ; with a longer time the cement would, of course, become harder, and a greater pressure realised. In the more recent researches of Professor Unwin, that authority found * the strength of terra-cotta to be as follows :—

	Dimensions.	Crushed tons per square ft.
Terra-cotta block.....	6 square in.	168
" " " " " " " "	15 " "	137
" " " " " " " "	15 " "	267
" " " " " " " "	6 " "	104

It is to be regretted that the precise nature of the blocks used in the last-mentioned tests was not described.

OBITUARY.

MR. JAMES PERS ST. AUBYN.—We much regret to have to record the death of this well-known and much-respected member of the architectural profession, which took place on the 7th inst., at the Manor of Marazion, Cornwall, where he had lived for some time past. Mr. Pers St. Aubyn was born on April 6, 1815, at Powick Vicarage, Worcester, and had, therefore, attained his eighty-year. He began his architectural studies as a pupil with the late Mr. Fulljames, of Gloucester, started in practice for himself at an early age in London and Devonport, being appointed Surveyor to the Manor of St. Damier. Among his early works are St. Paul's Church, St. James Church, St. Mary's Church, St. Stephen's Church, the Market, and the Prison, all at Devonport. He held the appointment for over thirty years Surveyor to the Honourable Society of the Mile Temple, and was for many years one of the Committee of Architects for the Incorporated Building Society. He was elected an Associate of the Royal Institute of British Architects in 1837, a Fellow in 1856. Among his other new church may be mentioned All Saints', Clifton ; St. Church, Erith ; St. Mary, Widdow ; St. Michael, Gallywood Common ; All Saints', Reading ; James the Less, Plymouth ; St. Peter, Revelstoke ; Holy Trinity, Charing ; Downham and St. John, Penzance ; and many mission chapels, school chapels in Cornwall and elsewhere. Works of church restoration were numerous in various parts of England, among which St. Helen, Ashby-de-la-Zouch ; St. Helen, Cheshire ; St. Gregory, Beckington ; St. Helen, Cheshire ; St. Mary, Cheshire ; St. Michael, Wolverhampton ; St. Michael, near Ely ; St. Michael, Woolverston. In Cornwall many of the churches were restored, him, which include, among others, St. Brice, Perran Utho, Perran Arworthly, Lelant, Germans, Lezant, St. Columba Major, St. Kea, St. Feock. Among his other works are several schools, parsonage-houses and mansions scattered about in various parts, and include the additional Castle, St. Michael's Mount, for Lord Levan ; to Merham-le-Hatch, for Sir Wynd Knatchbull ; to Rousham, for Mr. Cottrell ; and to Birch Grove, for Mr. W. M. Prad. Abbey Hall, for Mr. J. J. Jones ; and mansions at Delamore, Coombe Wood, Munt, Oakley Court, Anstie House, and Pencalnick Hill, Cornwall ; Brick Court, Garden Court, and Court, for the Temple, and a clock and carillon at Abberley. He was buried in the little cemetery at St. Michael's Mount, on the 11th inst., the bier carried from All Saints' Church, Marazion, over a causeway to the cemetery by eight masons and eight carpenters, in accordance with his wishes.

GENERAL BUILDING NEWS.

RESIDENTIAL FLATS, WELLINGTON COTTAGE, KNIGHTSBRIDGE.—Another of the great block of residential flats, which have been springing up late years and transforming the residential part of London, has just been completed. We refer to the Wellington Cottage, Knightsbridge, of which Mr. E. Collins is the architect. The building occupies a prominent position, facing the main road on the side, and Hyde Park on the other. It is arranged around an internal courtyard, laid out in the manner and tastefully supplied with hanging plants and a central fountain is ultimately to be provided. The principal novelties which we need point out in the planning and construction lie in the fact that many of the suites are arranged in floors, but self-contained, the servants' accommodation being placed in mezzanines, remedying a defect found in many flats, viz.,

* "The Testing of Materials of Construction," p. 438.

ment of servants' accommodation. Billiard-rooms, lavatory accommodation attached, are also annexed with certain suites. These average from ten to eleven rooms, and vary in price from 150l. to 250l. The tradesmen's entrance is kept distinct, being placed in Park-place, which runs along one side of the building. Internally, the whole construction is in steel, and so arranged that the water can be removed in any manner to suit individual tastes. The fittings show an advance in the buildings of this class. The modelled plaster ceilings in the reception-rooms are by Messrs. Jackson, of Rathbone-place, and exhibit careful workmanship and design. The electric lighting, by Mr. Adrian Collins, has wiring for 3,000 lights, and the system of switches and indicators has been carefully looked after. Bolding's syphonic closets have been used throughout the building. The lifts have been executed by Messrs. R. Waygood & Co., Limited, and there are one or two features connected with them which are of interest. They are made on the patent water-saving principle, which is automatic, and not dependent on the weight in the charge. The lifts are constructed with three cables, and the light load is being raised the first one is used; for a medium load the second one is used; and if a still higher load, the full power is employed. Thus, by a simple mechanism, the consumer's water bill is materially reduced. Another feature is the safety apparatus. The lifts are suspended by four steel-wire ropes, the failure of any one of which is automatically arrested by a device called into action by the remaining sound ropes; there is also a fifth rope of lighter make, which runs idle, and whose only duty is to pull the cable into action in the event, perhaps impossible, of all the four lifting ropes breaking simultaneously, without first having brought the safety apparatus into action. The lifts are controlled by three cables, and the iron gates are closed by a lever on Tuesday by severing one of the ropes near its anchorage, the lift being in motion, when the lift-gear was instantly stopped by the cable gripping the members at the back of the guides erected for that purpose. The buildings have been finished externally with red Mansfield stone and Fareham red bricks, Lascelles patent stone being used in the doorway and Park front. The iron gates and balconies are by Messrs. W. T. Allen & Co., and the general contractors are Messrs. Lovatt, of Wolverhampton.

CONSECRATION OF THE PARISH CHURCH, DENBIGH.—The Bishop of St. Asaph has just consecrated St. David's Church, Denbigh, which has been built and enlarged from plans prepared by Mr. R. Lloyd Williams, architect and county surveyor. The church has an entrance from the west tower into the nave, which is 74 ft. long and 33 ft. 6 in. wide. The aisles are divided from the nave by three arches on each side, above which are clerestory windows, and the north and south transepts are divided off by large arches rising nearly to the level of the nave roof. The chancel is 21 ft. wide and 10 ft. long, internally, the chancel arch being the full width of chancel. Smaller arches on either side open from the nave to a vestry on the north side and the organ-chamber on the south, and there is a larger arch opening from each to the chancel. On the north side there is a porch with doors opening into the vestry. The altar is raised seven steps above the floor of nave. There are small lancet windows in the aisles, and larger ones at the west end of the nave; large three-light lancets in each transept, and the organ-chamber and vestry are lighted by single lancet windows. The east window is also a three-light lancet window, and is so arranged that the painted glass in the old east window could be re-used with very little alteration. The glass in the sacristy portion of the old window is used up, and the single lancet windows which are placed in the north and south sides of the sanctuary are also filled with painted glass. A sedilia and credence niche are provided in the south wall. The whole of the interior of the church is lined with brick and the outside with stonework in irregular courses, the old one being used up, whilst all the door and window dressings (excepting those in crypt) are of freestone from Cefn and Ruabon. The roof over nave is open up to the level of the upper collar. The chancel and transept roofs are boarded, and have the rafters and moulded ribs dividing the lengths into bays. The floors of nave, transepts, aisles, and vestry are of wood blocks upon a concrete foundation, being supplied and fixed by the trustees, Messrs. Dovestone, Manchester. The chancel is paved with encaustic tiles, and the steps are of dark green Connemara marble. The stained glass in the windows is the work of Messrs. Ballantine & Gardiner, Edinburgh. The organ and lectern are by Messrs. Jones & Willis, of Liverpool; and the reredos and pulpit are by Messrs. Tarp & Hobbs, of London and Manchester. The tower was executed in British oak by Messrs. Harry Hems & Sons, of Exeter; and the chancel is paved with encaustic tiles supplied by Messrs. Carter &

Co., of Poole; and the marble steps by Messrs. J. & H. Pattison, of Manchester. The general contract was let to Mr. Samuel, of Wrexham.

NIGHT ASYLUM FOR THE HOUSELESS, GLASGOW.—A night asylum for the houseless in North Frederick-street, Glasgow, has just been re-opened after considerable repairs and alterations. The architects were Messrs. John Burnet, Son, & Campbell, the builder being Mr. Robert Murdoch.

DAUNTSEY AGRICULTURAL COLLEGE, WEST LAMINGTON, WILTSHIRE.—On the 7th inst., the Right Hon. Joseph Chamberlain opened the new Dauntsey Agricultural College, Wiltshire. The building stands in some 14½ acres of land, near the edge of Salisbury Plain. Mr. C. E. Ponting, diocesan architect, of Lockeridge, near Marlborough, is the architect, and Mr. Henry Hoskins, of Hungerford, has carried out the building operations. The frontage is 200 ft., and the building is of red local brick, relieved between the first and second floor windows with salt-glazed grey headers. Dormer windows are used. The main entrance is in the centre of the front, and is of freestone relieved with red bricks. The Dauntsey crest is over the doorway, and leading from the entrance-hall is a flight of steps of blue Victoria-stone, leading to the dormitories, &c., on the first floor. Over the staircase is a chamber fitted with three large tanks, to which the water supply for the building is pumped from a deep well in the grounds, and a bell turret is attached to the wall. On the ground floor there are offices for the clerk, a boys' library and recreation-hall, 24 ft. by 20 ft., and 15 ft. high; a large schoolroom, 52 ft. by 20 ft., sub-divided into class-rooms by movable screens; dining-hall, 41 ft. 6 in.; lecture-hall and museum, 42 ft. by 25 ft.; chemical laboratory, 30 ft. by 20 ft., fitted with lantern roof and fume covers. On the first floor are the dormitories, two fitted for 17 beds each, and one for 15. There are also rooms for assistant masters and store chambers. At the south-west end is a house for the head-master. Close to this are the domestic offices. A system of electric bells, also fire hydrants, and other necessary appliances have been fitted. A 4 ft. dado of glazed red bricks runs all through the rooms on the ground floor, and a corridor 180 ft. long, fitted with a similar dado, gives access to all the departments on the ground floor and to the head-master's house.

MUNICIPAL BUILDINGS AT HYSON GREEN.—Work has been commenced recently in connexion with a set of buildings for the Hyson Green district of Nottingham. For some years the Town Council have had under consideration the desirability of the establishment of a permanent police-station in that neighbourhood, but since the proposal was first brought forward the scheme has been very much enlarged, including now the erection of a reading-room, a public mortuary, and a fire-station, and the provision of an inquest-room above the charge-room and cells. The land upon which the works are in progress is situated upon the north side of Gregory-boulevard, at the junction of that thoroughfare with Radford-road. The charge-room will be situated at the junction of the boulevard and the Radford-road, so that the officers on duty can have the main roads under observation. Four cells will be provided at the side of the charge-room, separated from the latter by the entrance. Above the charge-room is to be erected the room in which inquests are to be held, this being 24 ft. long by 16 ft. 6 in. wide. As in the case of the other district police-stations, the sergeant in charge will have a residence attached to his official, and this is to be erected next to the cells. It has been thought advisable to enlarge the accommodation originally provided in connexion with these buildings, and a fire-station will now be built to hold a steam fire-engine, a large hose-reel, and a combination fire-escape. There will also be stabling room for three horses. Upon the Carrington side of the fire station will be the mortuary and post-mortem room, these being approached from a yard adjoining Gregory-boulevard. Separated from the mortuary by this yard is to be erected the reading-room, which is planned to be 67 ft. long by 28 ft. wide. It is intended to establish a branch free library, and the room will be fitted up as a reading-room. In accordance with the regulations attached to the land, the buildings, which will be of plain brick with stone dressings, have to be set back 20 ft. from the Gregory-boulevard, but the charge-room will abut upon the pathway in Radford-road. The contract has been let to Mr. J. J. Adams, of Nottingham, and the work is being carried out under the supervision of Mr. Arthur Brown, the Borough Engineer.

PUBLIC HALL, BRODICK, BUTE.—Brodrick Public Hall was opened on the 10th inst., by the Rev. H. Robertson Fullarton. The hall has been erected from the designs of Mr. Burnet, Glasgow.

UNITED METHODIST FREE CHURCH, CAMELFORD, CORNWALL.—The Camelford United Methodist Free Church trustees have accepted the tender of Messrs. H. H. H. & D. D. Builders, of Camelford, for alterations and additions to their building. The architects are Messrs. Wise & Wise, of Launceston.

BAPTIST CHAPEL, CAMBUSLANG, LANARKSHIRE.—A Baptist Chapel at Cambuslang was opened on the 12th inst., by the Rev. W. Landels, D.D., Edinburgh. The church has accommodation for

700 persons, is of red stone, with front gallery and hall. The builders were Messrs. Warnocks & Horsburgh, and architect, Mr. Wm. Ferguson, Cambuslang. The cost of the erection was about 2,000l.

OAK CHOIR SEATS, ASHLEWORTH CHURCH, GLOUCESTERSHIRE.—New oak choir seats, designed to match the Jacobean pulpit, have recently been given to this church by an anonymous donor. A new reading desk, in which a panel, dated 1635, forms the front, and the restoration of the fine old pulpit completes the new work, which has been carried out by Messrs. Collins & Godfrey, of Tewkesbury, from the designs and instructions of Mr. Robert Marchant, architect.

FOREIGN AND COLONIAL.

FRANCE.—A committee has been formed in Paris for the erection of a mosque.—An international exhibition of the centenary of lithography is to be opened on August 15, in the Galerie Rapp.—In the Avenue des Champs Elysées an interesting historical and military exhibition of the Revolution has been opened, under the direction of M. Detaille, the eminent painter.—There is a curious exhibition of pictures by Claude Monet, open in the Durand-Ruel Gallery. Among the number are no less than twenty studies of Rouen Cathedral.—The "Société d'Encouragement à l'Art et à l'Industrie" will shortly open its fifth competition in decorative design at the Ecole des Beaux-Arts. The subject will be a decorative design including a thermometer and barometer.—The Minister of Public Works has just laid the first stone of the viaduct on the line from Carmaux to Rodez. This is a very important work, which will cost 2,600 francs, and will cross the river Vrain through which the river Vrain runs. It will be about 460 metres long and 117 high. The central bay will be 220 metres wide. The bridge portion will be of steel. M. Bodin-Legendre is the engineer.—The Minister of War has just opened the new school of military surgery at Lyons, built from the designs of M. Raoul Duboussé. A monument has just been inaugurated, at Bapaume, to the soldiers who fell in the battle there in 1871. The monument is the work of M. Cordonnier, and consists of a large circular granite base decorated with plaques of marble covered with commemorative inscriptions. Above this is a rock with a cross erected on it. Six new monuments are to be erected, this summer, to the memory of soldiers who fell in the great war. The most important is that to be erected by the Municipality of Perpignan. The five others will be at Thionville, Hélicourt, Pay, Orange, and Chartres.—The meeting of the Congrès Archéologique of France will be held, this year, at Clermont-Ferrand, from the 6th to the 12th of June.—M. Georges Bareau, the sculptor, has been commissioned to execute the monument which is to be erected at Ploermel, to the memory of the eminent doctor, Alphonse Guérin.—An exhibition of the works of M. Fouace, the painter, who died a few months ago, has been opened at the Ecole des Beaux-Arts.

MISCELLANEOUS.

A FLUSHING-RIM FOR BATHS.—Mr. H. Riley sends us a drawing and description of a new method of supplying water to an ordinary bath by means of a flushing-rim, by which the incoming water is admitted in a sheet all round the bath, thus cleansing all its surfaces and sweeping away anything that may have adhered to the sides. The other advantage claimed, that hot water thus admitted warms the bath, is rather doubtful, seeing that the water does so by parting with its heat to the bath. It is the water we want hot, not the bath.

MEMORIAL CROSS, ST. ANDREW'S CHURCH, PLYMOUTH.—A memorial cross has just been erected at St. Andrew's Church, Plymouth, from the designs of Messrs. Hine & Odgers, architects, of Plymouth. It is 70 ft. high, and the base is of polished granite, surrounded by steps, octagonal on plan, of Plymouth limestone. The fabric generally is of Portland stone. A red sandstone, raised in imitation of Michelangelo, is introduced in alternate layers. The cross may be divided into three distinct tiers or stages. On each of the four faces of the first or lower one, there is a moulded arch with double shafts and carved capitals. The recesses contain slabs of polished granite, on two of which are inscriptions. The central stage is treated somewhat similarly to the lower one, but is higher, and it contains niches for statuary. At either angle are pinnacles. Above are more pinnacles, and a crocketed spire terminating with a cross of wrought copper. The carved foliage throughout the fabric has been done by Messrs. Harry Hems & Sons, of Exeter. In each of the four niches, resting upon a base carried by a polished granite column, is an allegorical statue. That on the south side is one of Hope, with an anchor by its side; on the north stands Peace, wearing the crown; on the east, Faith, with the cross; and on the west, Charity, with an orphaned little one in her arms. A new boundary wall has also been erected, designed by Messrs. Hine & Odgers, the piers being carved by Messrs. Hems & Sons. The wrought-

iron work is by Messrs. Hardman & Powell, of Birmingham. The general contractor for all the works is Mr. John Finch, of Plymouth.

CLOCK AT THE PARISH CHURCH, SHEPHEP, LEICESTERSHIRE.—A large clock, with Westminster chimes, has just been fixed at the parish church, Shepshed, by Messrs. John Smith & Sons, Derby, and was formally started by the Bishop of Peterborough.

THE LONDON SCHOOL BOARD AND THE ARCHITECT'S SALARY.—At a meeting of the London School Board on the 9th inst., at the offices on the Victoria Embankment, General Moberly moved (on behalf of the Works Committee) that the salary of Mr. T. J. Bailey, the Board's architect, should be raised from 900*l.* to 1,000*l.* per annum. Mr. Huggett moved as an amendment that Mr. Bailey should be merely granted an honorarium of 300*l.* for the extra work he had done in preparing plans and drawings for the enlargement of the Board's offices. The Rev. W. Hamilton formally seconded the amendment, though he disapproved of it. Mr. Barnes protested against both proposals. He objected to putting hundreds of pounds on to highly-paid officers, when the Board declined to hear of increases in the case of lower officials. The amendment was lost by 11 votes against 24; and the original motion was carried by 21 against 18, most of the Progressives voting in the majority.

BUILDING TRADES' INDUSTRIES FEDERATION, GLASGOW.—A mass meeting of the Glasgow and Suburbs Building Trades' Industries Federation was held in the North Salon of the City Hall, Glasgow, on the 10th inst. Mr. Alex. M'Cormick, the President, occupied the chair. The Chairman said the aim of the Federation was to raise the conditions of the men to suit their lives. He asked the different trades to lay aside their petty jealousies and work together for the same end—that of raising their position, and giving them fuller opportunity for enjoying family life and for improving their intellects. Mr. James Falconer, joiner, moved a resolution to the effect that, as trades unionists, they believed that by mutual federation of the various societies connected with the building industries, much good could be effected both for defensive and organising purposes, and they therefore called on all to enrol themselves members of the Federation. He contended that, while the society connected with each trade might do all that was required for the benefit of the members, yet if they were federated an advance of wages might more easily be obtained, and strikes would become things almost unknown. Mr. James Gunn, bricklayer, seconded the resolution, and expressed his belief that federation would accomplish more for the workers than did the trades unions which worked on the old lines. The resolution was put to the meeting and carried unanimously. On the motion of Mr. W. Smith, National Labourers' Union, the meeting pledged itself to use every legitimate means to induce outstanding societies of the building trades to join the Federation at the earliest opportunity.

DIOCESAN SURVEYORSHIP APPOINTMENTS.—Mr. Arthur Baker and Mr. Richard P. Day, both of London, have been appointed Surveyors of Dilapidations in and for the Diocese of London in accordance with the Ecclesiastical Dilapidations Act of 1871, to fill the vacancy caused by the recent death of Mr. Gordon M. Hills who held the appointment as sole Surveyor for the Diocese since 1871.

MARBLE MEDALLION PORTRAIT, ST. PAUL'S CATHEDRAL.—A marble medallion portrait of Sir Robert Montgomery was unveiled on the 13th inst., in the Crypt of St. Paul's Cathedral, by Sir Henry Davies. The medallion is the work of Mr. Bruce-Joy.

APSE WINDOWS, GRACECHURCH, UTICA.—Referring to this design, which was published among our illustrations on May 4th, Mr. Holiday writes:—"I find a rather comical error, for which I am afraid I am responsible, in the description of the Apse Windows at Utica, where I had described the centre panel as representing the Saints' Rest in Paradise. This description is correct as regards the windows as they now stand; but in the original design, from which your reproduction is taken, I had occupied this space with the Three Children in the Furnace, supposed to be singing their hymn. I fear this may be regarded as a rather singular illustration of the Saints' Rest in Paradise."

A CONTAINER FOR SINK WASTES.—The Falkirk Iron Company send us drawings of "Rowland's container for sinks," which is a perforated metal cup, about the shape and proportion of an ordinary tumbler, and with a projecting flange round the rim, which is intended to fit into the upper portion of a sink waste, just above the usual S bend. By this means all matter which under ordinary circumstances might accumulate in the bend, which always requires cleaning from time to time, would be caught by the container, which can be lifted out and cleaned as often as necessary without the least trouble.

LEGAL.

THE NEW SEA-WALL AT FLEETWOOD.

The case of Walmsley & Co. v. The Urban District Council of Fleetwood came before the Court of Appeal, consisting of the Master of the Rolls and Lords Justices A. L. Smith and Rigby, on Monday

last, it being the appeal of the defendants from the decision of Mr. Justice Day, in Chambers, confirming the decision of the Registrar of the District Registry, refusing to refer the matters in dispute to the Surveyor to the Urban District Council of Fleetwood. It appeared that the plaintiffs were builders and contractors, and under two contracts they had undertaken to construct a sea-wall and carriage drive for the defendants—then the Improvement Commissioners for the district of Fleetwood. During the progress of the works the plaintiffs represented to the defendants through their surveyor that the sea-wall, which according to the specification was only to be 16 in. thick, would not be strong enough to resist the force of the sea, especially in stormy weather. The defendants' surveyor, on the other hand, entertained a different opinion, and ordered the work to proceed as usual, in accordance with the plans and specifications. Subsequently a portion of the sea-wall gave way, and the plaintiffs being required to rebuild it, did so. They claimed an additional sum of 3,401*l.* 5*s.* 10*d.*, which the defendants wished to recover from the plaintiffs. The plaintiffs alleged, under two clauses in the two contracts they had entered into with the plaintiffs. This was declined. When the case was entered for hearing at the Manchester Assizes the Registrar refused to entertain an application to stay the proceedings, and on an appeal to Mr. Justice Day he confirmed the decision of the Registrar; hence the present appeal. The Court, after hearing Mr. Willes-Carter on behalf of the appellants (the defendants), and without calling upon counsel for the respondents (the plaintiffs), dismissed the appeal with costs.

THE LONDON BUILDING ACT, 1894.

MATTHEWS v. SALT.

An important decision was given by Mr. Horace Smith, the magistrate sitting at the Clerkenwell Police Court, on Friday, the 3rd inst., with especial reference to Section 212 of the new London Building Act.

The defendant, a builder, who was erecting a beer house in Collier-street, Pentonville (for Messrs. Whitbread, the brewers), was summoned by the complainant, the acting District Surveyor of Clerkenwell (during Mr. Carrick's absence from ill health), for not separating, by a fire-resisting floor, that part of the premises used for trading from the part used as a dwelling house, the total area of the building exceeding ten squares.

The builder's notice was dated January 23, 1895, and the buildings were commenced about the end of February. It appeared that some letters passed between the freeholder's agent and Messrs. Whitbread in April and May, 1894, by which the latter agreed to take the premises from the freeholder and to build a new house thereon, and that the terms of these letters were embodied in a more ample formal contract of September 10, 1894. The drawings for the new house were as required by Clause 4 of the formal contract approved by the freeholder's surveyor about the end of October, and the formal consent given to them on November 1, 1894. When the drawings were submitted to the District Surveyor he called the attention of Messrs. Whitbread's architect to the requirements of Section 74 of the Act as to the construction of the building in certain particulars of fire-resisting materials, and served the builder with notice of objection under Section 150, on which the builder took no steps, as he contended that the contract for this building was entered into before the passing of this Act, and that, therefore, he came within Section 212, and the new building would be erected in compliance with the old law.

The builder having proceeded to erect his building, and having laid fir joists for the floor forming the separation of the first story (which consisted of the living and sleeping rooms for the occupier) from the ground floor, notice of irregularity was, on April 4, served on him by the District Surveyor, under Section 151, and a summons issued on the notice not being complied with.

On behalf of the builder it was argued by Mr. J. P. Grain, who appeared with Mr. Sidney Knox, the defendant, that the contract under which the house was being built dated from April 16 last year, when Messrs. Whitbread purchased the lease from the tenant of the premises. He said they then applied to the surveyor to the freeholder for a building-lease, and on May 31 they received a letter containing the terms on which a new lease would be granted.

These were accepted by them except as to the amount to be expended in rebuilding, which was afterwards agreed. The formal contract was signed on September 10, 1894, and the drawings were submitted on October 5 to the freeholder, and afterwards signed. Mr. Grain contended that the letters between the parties, dated May 31 and June 5, constituted a good contract, and could have been legally enforced. He also argued that if the magistrate was against him on this point that he submitted that a public-house did not come under Section 74, and that to build a wall around the bar-parlour, which was part of the domestic building, and not the public-house, would make it absolutely useless, and further, that notwithstanding the defendant had not appealed

to the magistrate under Section 750 to set aside the requirements of the District Surveyor, that it was still open to the magistrate to decide what should be done.

Mr. T. Seager Berry, from the office of the Solicitor to the London County Council, pointed out that, as the passages and staircase had not yet been constructed, and that consequently no drawing had been agreed on by Mr. Grain on September 10, 1894, the defendant was not bound simply for making the floor fire-resisting.

The Magistrate, without calling on Mr. Berry, stated that, although he agreed that the arrangement came to in the letters of May 31 and June 5 was a binding contract between the owner and tenant, he did not consider such a contract was a contract as meant by Section 212. Contract in that Section, in his view, meant a contract to make a particular building, and not a contract to purchase or take land on which a building is to be erected. He did not think that in this case a proper contract to satisfy that Section had been made till the document of September 10, 1894, was signed, and the plans mentioned therein drawn. He was against Mr. Grain on Section 74. He thought the Section applied to a public-house, which did not come within the Section referring to hotels and public buildings, and it seemed to him that a public-house must be held to be a building used in part for the purposes of trade.

He therefore ordered that the whole of the floor under the dwelling-rooms should be made of fire-resisting materials.

CAPITAL AND LABOUR.

THE BUILDING TRADE AT BOLTON.—A dispute in the building trade at Bolton was settled on the 13th inst. by the masters conceding a halfpenny per hour and reducing the working hours from 52 per week to 49½ in winter and 47 in summer.

BRICKLAYERS' STRIKE AT CROWNHILL.—The award of the Mayor of Plymouth (Mr. W. Law) respecting the dispute between Messrs. Pettibon & Co., who have a large contract for building cavalry barracks at Crownhill, and the bricklayers has not been taken up. Messrs. Pettibon suggested arbitration several months since, but the offer was rejected. The Mayor's award is as follows:—Walking time to be disallowed, and payment of wages is to be made at the rate of 8*d.* per hour to bricklayers residing at Plymouth.

BUILDING TRADE WAGES IN FRANCE.—A recent elaborate and exhaustive report by the United States Commercial Agent at Roubaix on the hours of labour, wages, working days per year, classification of workers, and other questions immediately relating thereto as they exist in Paris and the Department of the Seine, contains much information of value to the building and allied industries. These industries give employment to skilled and unskilled workers in about equal proportions, except in the construction of earthworks, where the majority of workmen are labourers. Work rarely ceases on Sunday except in the masonry trade. The average duration of a working day is from 9 to 10½ hours according to the season. During the summer painters work 10 hours, masons 12 hours, paviors 12 and 12½ hours, and in winter the hours are sometimes reduced to 7½ for these trades. The Report contains a table giving the wages per hour accorded to first-class workmen in the building industries by the Board of the Department of the Seine, in comparison with the official tariffs of wages of the City of Paris and the Society of Architects.

MEETINGS.

FRIDAY, MAY 17.

Association of Municipal and County Engineers.—Western Counties District meeting, to be held at Plymouth 8 p.m.

SATURDAY, MAY 18.

Institution of Junior Engineers.—Visit to the Imperial Institute, to inspect the heating system, and other engineering features.

Association of Municipal and County Engineers.—Western Counties District meeting (concluded).

MONDAY, MAY 20.

Royal Institute of British Architects.—Professor Baldwin Brown, M.A., on "Anglo-Saxon Architecture" 8 p.m.

Victoria Institute.—4.30 p.m.
Society of Arts (Lector Lecture).—Mr. Ernest Hart "Japanese Art Industries." 1. 8 p.m.

TUESDAY, MAY 21.

Institution of Civil Engineers (in the Temporary Offices, No. 9, Great George-street).—Last Ballot of Members for the Session. 8 p.m.

WEDNESDAY, MAY 22.

Carpenters' Hall, London Wall (Lectures for day and outdoor Foremen).—Professor T. Roger Smith "The Framing and Constructing of Partitions and Floor and Temporary Structures." 8 p.m.
Society of Arts.—Mr. A. G. Charleton on "The Dressing and Metallurgical Treatment of Nickel Ores." 8 p.m.

THURSDAY, MAY 23.

Society for the Encouragement of the Fine Arts.—Third Conversazione, at the Galleries of the Royal Institute of Painters in Water Colours, Piccadilly.
Institution of Electrical Engineers.—Continuation of discussion on Mr. Mark H. Robinson's paper "On the Recent Development of the Single-acting High-speed Engine for Central Station Work." 8 p.m.

ALNWICK.—For the erection of a pair of houses, Christon
ank, for Messrs. J. & G. Young. Mr. Geo. Reavell, architect,
Alnwick.—

Masonry.—W. Downey, Rennington.....	£25	0	0
Joinery.—H. Archbold, Alnwick	135	0	0
Slat ng.—J. Purdie, Alnwick	30	1	½
Plastering.—T. Wood, Alnwick	42	15	0

GUILDFORD — For 1 unit, g. & c., Crownwell House, (America) road, Guildford, for Mr. May Colet rooke. Mr. A. Sarges, architect, Guildford
Higlet & Hammond ... £102 Robert Wood
P C May ... 57 Stanley Ellis (accepted) ...

WARRINGTON.—Accepted for the supply of granite cubes, &c., for the Corporation. Mr. Thos. Longdin, Borough Surveyor, Town Hall, Warrington.
 Clare & Ridgway £1 3 0 Granite cubes, per ton
 Poulton & Co. 0 3 0 Tiles, per doz.
 Slate Co., Limited. 0 3 0 Curbs, per yd.
 Clare & Ridgway 0 3 4 Flags, per sq. yd.
 [All of Warrington.]

WHITEHAVEN. (Cumbria).—Accepted for the execution of sewerage works. Goodson & Co., the Rural District Council, Messrs. Pickering & Crompton, C.E.s, Whitehaven. Quantities by two engineers.
 E. Wain Mordue, Whitehaven. £49 10 6

WIGAN.—For the erection of two dwelling houses, &c., Barnes-road, St. Michael's, for Mr. Jacob Smith. Mr. Rigby, surveyor, King-street, Wigan.
 W. M. Thompson. £69 0 0 P. Westhead & Sons, Green.
 Thos. Pennington. 250 0 0 Wigan-street, Wigan. £48 5 0
 Thos. Ridgway & Son. 540 0 0 * Accepted.

WORKING.—For proposed alterations and additions to Messrs. Knight & Littleboy's premises, Working, for Mr. William Wells. Mr. A. J. Sturges, architect, High-street Chambers, Guildford.—
 Huggitt & Hammond. £50 0 0 James Whitburn. £45 0 0
 E. C. May. 476 0 0 Harris & Son. 392 0 0
 Stanley Ellis. 454 0 0 * Accepted.

WORKING.—For new stabling and store for the Friary, Holyrods & Healy's Brewery Co., Limited. Mr. A. J. Sturges, architect, High-street Chambers, Guildford.—
 Huggitt & Hammond. £477 0 0 Stanley Ellis. £447 0 0
 E. C. May. 485 0 0 Harris & Son. 345 0 0
 * Accepted.

WORKINGTON. (Cumberland).—For the erection of sulphate house and line-shed, for the Gas Committee. Mr. John Johnson, Engineer and Manager.—
 Jno. Stewart. £165 0 0 Jno. Murchie. £160 0 0
 J. L. Wain. 9 11 2
 [All of Workington.]

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THE "BUILDER" CATHEDRAL SERIES

ENGLAND AND WALES.
 In each case—EXTERIOR VIEW, specially drawn for this series, GROUND PLAN to a large scale, shaded to indicate the date and style of the several parts; DESCRIPTIVE ARTICLES, with sketches of details, &c.
 1. Canterbury. J. Norwich. 17. Llandaff. 24. Truro.
 2. Lincoln. 19. Be-leader. 18. Oxford. 25. St. David's.
 3. St. Albans. 21. L. L. 19. Southwell. 26. York.
 4. Peterborough. 12. G. 19. Worcester. 27. Ely.
 5. Wells. 13. St. Paul's. 21. Bangor. 28. Chester.
 6. Ely. 14. Hereford. 22. St. Asaph. 29. Manchester.
 7. Salisbury. 15. Winchester. 23. Worcester. 30. Carlisle.
 8. Exeter. 16. E. 24. Durham.
 9. Bath. 17. E. 25. Winchester.
 10. Gloucester. 18. E. 26. Winchester.
 11. Hereford. 19. E. 27. Winchester.
 12. Lichfield. 20. E. 28. Winchester.
 13. Lincoln. 21. E. 29. Winchester.
 14. Llandaff. 22. E. 30. Winchester.
 15. Llandaff. 23. E. 31. Winchester.
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The Builder.

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ILLUSTRATIONS.

Interior of Roman Bath, Bath, as Intended to be Treasured.—Mr. J. M. Brydon, F.R.I.B.A., Architect *Double-Page Ink-Photo.*
 Pump Room Buildings, Bath; Revised Design.—Mr. J. M. Brydon, F.R.I.B.A., Architect *Double-Page Ink-Photo.*
 Organ Case, South Transept, St. Saviour's Church, Southwark.—Sir Arthur W. Blomfield, A.R.A., F.R.I.B.A., Architect *Double-Page Ink-Photo.*
 New Almshouses at Palmer's Green, for the Skinners' Company.—Mr. W. Campbell Jones, A.R.I.B.A., Architect *Double-Page Photo-Litho.*

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Domestic Architecture at the Royal Academy.



As already observed, domestic architecture is more largely represented in the Royal Academy Architectural Room this year than designs for public buildings;

though even in this class there are few large houses illustrated, the majority being houses of moderate size, and small villas of a picturesque type. Of this picturesque class of house there is, in fact, a little too much at the present time, if we take the Academy show of drawings as at all a typical representation of the taste of the day; and on the whole it probably is fairly so.

There seem to be at present a large number of moderate-sized and small private houses carried out, and comparatively few of the class which are sometimes called "mansions." We are speaking not merely from the indications at the Academy, but from general observation. The desire to have a house of one's own, conforming to and expressing one's own personal taste, is probably a great deal more prevalent now than it formerly was; people who would formerly have been content with a good square-built builder's erection, if convenient and comfortable, desire now to have a home belonging to themselves and expressing some amount of architectural taste. The spread of this predilection among the middle classes of the country has led to the designing of a great number of small and medium-sized houses of late; while the erection of mansions on a large scale has become comparatively rare, probably because few persons at present have large sums of money to spare on such works. Perhaps other causes, social and political, combine to discourage the building of large family seats. The income required to build and keep up such residences depends often, to a great extent, on land, and land is felt to be a class of property very much threatened at present.

This cannot be helped, but in an architectural sense the decay of the mansion is much to be regretted. The carrying out of a large and stately house, in an adequate manner both practically and æsthetically, is one of the most interesting tasks an architect can have, especially where the owner is a man of cultivated taste, who can appreciate the

architect's work. And unquestionably the comparative abandonment of house-building on a large scale means the loss of a great source of beauty and interest in English scenes.

We cannot but regret also the neglect, among the large country houses which are still built, of the element of stateliness which characterised the great mansions of the English Renaissance. In most of the large houses recently built the tendency seems to be towards the irregular picturesque. It may be urged that there is more of a homelike expression in this style of irregular design, but there is a great loss of dignity, and dignity is a fitting element in a country house of the largest class. That admiration for the English Renaissance mansion has been very much revived of late, in theory, is evident from the success attending such works as that of Mr. Gotch, and the interest which its publication excited. But in practice we seem to have nearly abandoned this method of symmetrical and stately house design, and the modern mansion, in consequence, lacks architectural unity and impressiveness, and tends to look too much like a number of smaller houses thrown together. This is what strikes us in such a design as Mr. Wallace's "Philiphaugh" (1,577), an excellent specimen of its class, and shown in a very effective drawing. The introduction of a large tower is one of the best means of dominating the mass of building in such a case, and giving it a certain unity, but in this case the tower is hardly sufficiently predominant for its purpose. The want of a plan is doubly felt in the case of a design of this kind, as there is nothing to interpret in any way the ins and outs of the external architecture, nor can we guess from the drawing whether this is an entirely new mansion or an old one treated and added to. Mr. Young's "Duncombe Park" (1,484) is the only example in the room of the palatial style of mansion. This is in the severe Classic style of English mansions; a central mass decorated with a great Tuscan order of pilasters, and flanked by carved colonnades as wings. This is stateliness on the other hand of somewhat too cold and formal a type, though of its kind it is very well carried out. There is no plan either to this. Plans of this and the last-named would have afforded an interesting comparison as to respective types of plan, the formal and the informal. The latter is no doubt far more ductile in regard to the convenient

arrangement of rooms, but the former affords a far better chance for dignified architectural effect internally. What may be called the rambling type of plan is more suited to a medium-sized house than to a very large one.

These two, and an uninteresting quasi-castle in County Cork, by Messrs. Darbyshire & Smith (1,580), are the only houses of the largest class which are illustrated, as far as we have observed, in the exhibition. Messrs. Niven & Wigglesworth show, in "Teith View, near Doune" (1,460) a sketch of a tolerably large house of the modern Scotch castle type. In the country houses of medium-size it is noticeable that what may be called Domestic Gothic still keeps its place. Of this class Mr. C. J. Ferguson's "Badsworth Grange" (1,521) is one of the most important; a house in which there is a certain amount of symmetrical balance in the general treatment of the exterior, though the mullioned windows are treated and spaced very irregularly, and in the left-hand gabled wing the apparently accidental placing of the two windows has rather an awkward appearance. The quasi-Classic or Elizabethan treatment of the entrance-door seems a little out of keeping in a design in which no other detail of the kind appears. A plan is added which shows the house to be commodiously arranged internally. The octagonal porch projecting into the entrance is a very good feature from the exterior, but internally it must appear to project awkwardly into the outer hall and crowds too close upon the foot of the principal stair, the first step of which is within less than 5 ft. of it, according to scale. The author escapes, however, the difficulty of the external porch, which so often looks like an extra thing tacked on to the main building. Mr. C. J. Blomfield's house at Poulton (1,524) is another very plainly-treated house with mullioned windows, in this case all placed symmetrically and centralised, at least in the main front; this is a rather more Elizabethan type of house than the last, though in a very simple form, the only details being string-courses and ball finials on two of the gables. There is a pleasing air of repose and homeliness about it. The plan, we fear, is open to some criticism. It is rather wasteful in passages; and the kitchen window and fireplace are very badly placed for getting light to cooking operations, the only window being at the opposite side of the room to the fireplace. A kitchen fireplace should always have a side-light.

Two interiors of large halls may be noticed. Messrs. Ernest George & Peto's hall at "North Myms, Herts" (1,512) shows an interior with a large projecting stone fireplace with a carved frieze on it, and a landing with balustrade in pierced woodwork, making a bridge over the hall. The detail of this is rather slight in comparison with the massive style of the rest of the work, and seems a little out of keeping with an otherwise effective interior. The other drawing referred to is Mr. Goldie's hall at "Ashorne Hill House" (1,435), an interior of Elizabethan general type, with a colonnade in woodwork, apparently, in which the columns are rather playfully treated in a baluster-like form, turning in at the base, a small detail which gives the slightly picturesque character suitable to the general scale and treatment of the whole. We should also mention the fine water-colour drawing of Mr. Young's staircase at "Gosford House" (1,529); this is in much the same manner as the staircase of the Glasgow Town Hall, a severely Classic interior in which much of the effect is produced by the employment of marble veneering. This is a kind of treatment in which costliness of material plays a considerable part in the effect; there can hardly be said to be anything very original in the design, but it is a thing very completely carried out according to its type, and shown in a very fine and effective drawing.

Mr. Belcher exhibits an elevation of "Bearcro, Berkshire" (1,504), a brick house with stone mullioned windows, and of rather irregular outline, which does not call for special remark, especially as there is only a block plan to explain it. We have to protest again and again against this habit of exhibiting illustrations of houses without plans. In the French architectural exhibitors such a thing as a design without a plan is never seen, and it ought to be the same in the Architectural Room of the Royal Academy.

A considerable number of the smaller house drawings are examples of the endeavour which we see constantly at the present day, especially among the younger generation of architects, to produce something unusual and characteristic. Some of the drawings show the same desire, in their manner and execution, to do something new and uncommon. It may be that this is being carried a little too far, and results in too conscious a striving to be picturesque, but it is at all events more interesting than formality and an adherence to types which have become tedious by repetition. Perhaps a more valid objection may be that some of these picturesque small houses are too deficient in solidity of appearance and construction. It is doubtful whether half-timber work is not now an anachronism. It belonged to days when carriage of materials over long distances was practically impossible, and carriage over short distances expensive; the materials to hand were used as far as they would go, and timber came cheaper and handier than brick. Now that railways can deliver brick and stone from any part of the kingdom to another with no difficulty and at comparatively moderate cost, the use of half-timber building serves only an æsthetic purpose, and it may be questioned whether the interest in it on that account will be very long-lived. Hence we do not feel very much sympathy with Mr. Briggs's studies in old English house-style, as exhibited in the two drawings of the house at Oxted (1,506, 1,518); the revival of an old style is very well carried out, but it is out of place in the nineteenth century, and in a few years, when the fashion for it has gone out, will probably be felt to be so. Mr. Aston Webb makes a significant contrast to this in his "Summer Cottage, Isle of Wight" (1,529), which has a character of almost castellated solidity; if this is intended as appropriate to a house in a situation near the sea, we rather agree with the idea, though, perhaps, for anything called a "cottage," it is rather overdone. Among the smaller drawings which aim at character may be noticed, that by Mr. Veysiey, "House


at Colwall" (1,452), an elevation showing apparently rough-cast walls amid a framing of timber-work, painted a dull green tone; there is certainly character both in the design and the drawing, but if this is a dwelling-house, there is rather an affectation of rusticity about it, and it suggests a street shop in a small market town rather than a dwelling-house in the ordinary sense. Mr. Ashbee has given some character to his "'Magpie and Stump,' Cheyne Walk" (1,487), a tall, narrow brick house, with a projecting bay of peculiar plan—a semi-circle projecting from the front face of a semi-octagon—carried up through several stories, and finishing flat at the top. A complete set of plans are added. Mr. Mitchell's "The Gables, Harrow-on-the-Hill" (1,510), owes a good deal, we suspect, to the effectiveness of the water-colour-drawing, by which we have often found that a picturesque and "ancient" character is imparted to a house which in reality looks a good deal less picturesque than the drawing, the effect lying a good deal in a kind of texture and surface which can be indicated in a drawing, but which only age imparts to the actual building. A plan is added, with which we have no fault to find, and which is noticeable for its large and spacious hall, a feature, however, which scarcely indicates itself sufficiently on the exterior design. Another house design which is carefully illustrated with large-size plans is that by Mr. Ambrose Poynter for "A Suburban House" (1,597). The simplicity and absence of pretence in the house are worthy of praise, as far as the front is concerned, but the mass of hipped roof into which the cornices of the bays die has rather an ugly effect, as well as the window cut out of the corner of the house in the rear. Why place a window where it must appear to weaken the angle of the building? The author is to be commended for attaching so much importance to the plans, and showing them to a good large scale; we wish others would follow his example; and the management of the little octagon hall with its two columns is a very pleasant and clever bit of planning; but the author, like some of his friends of the specially "artistic" set, has some practical things to learn about planning. The dining-room door is made to open close on the fireplace, and not only so, but is carefully shown to open the wrong way, so as to lay the whole room open to view from the hall and front door when it is opened; it should have opened the contrary way with its back to the fireplace, so as at least to screen the latter somewhat; such an arrangement as is shown here is enough to destroy all the comfort of a room. The drawing-room door likewise opens the wrong way; and the kitchen fireplace is at the opposite side from the window. A cook would tell him that it would be impossible to see what she was doing over that fire at all. These mistakes about doors and windows are what we are constantly coming across in the plans of houses by those who represent the "art-architect" persuasion in the profession. If they are above the consideration of these little points which affect the comfort and convenience of a house, they will be likely to hear of it from some of their clients.

Among drawings of a special type are two which represent not so much a house as a house and surroundings. Mr. Lorimer's "Earl's-Hall, Fife" (1,446) is an interesting bird's-eye view in pen-and-ink of the restoration of an old Scotch house, the former dilapidated state of which is shown in a corner sketch, the main drawing showing the house (not very much of it) with the whole very complete laying-out of the very elaborate formal garden, orchard enclosure walls, and the small buildings at the angles of the enclosure. Unfortunately, only a block plan is shown; we should have liked a separate plan and elevations of the house. However, the drawing is a very interesting one of its kind, which we shall publish shortly, when the architect has promised some information about the old house, which

has, we believe, a rather interesting history. Mr. Inigo Thomas sends a coloured perspective, very green, also a bird's-eye view, of a "church-house and garden" (1,598), but here the architecture is so entirely in abeyance that nothing can be made out of it, and we hardly see that such a drawing has a place in an Architectural Room, unless as an accompaniment to drawings showing the building properly; nor, we must confess, can we see anything of particular interest in the laying out of the ground.

A drawing of a foreign house by an English architect (Mr. Brydon), the "Château de Buillon" (1,574), is of interest in more ways than one. It is apparently a house for an artist, with an upper timber stage mounted on very plain and solid masonry walls, and a plain octagon stair-turret attached, with a conical roof, and an open balustraded stage at the top, half-reminding one, in a peaceful way, of the usual termination of an early French château turret; a plan is added. Among designs for purely street architecture (by which we mean street fronts, and nothing else), which are not very numerous, Mr. Beddingfield's "A Street Front," though it is a rather hard pen drawing, deserves notice for its special and rather unusual treatment, with plain octagon flanking turrets rising out of square projections on the ground story, one of which forms the porch; the series of windows in the centre wall, marking the upper floor, are stopped by the angle turrets. It is rather a new way of treating a street house-front, and as such worth attention. Mr. W. T. Walker shows a characteristic little street front in "Premises, High-street, Uttoxeter" (1,471); and Mr. W. Tillott Barlow goes a little out of the usual beat in his three small sepia-washed drawings of interiors, entitled "Three Alternative Designs for the Treatment of the Study" (1,591).

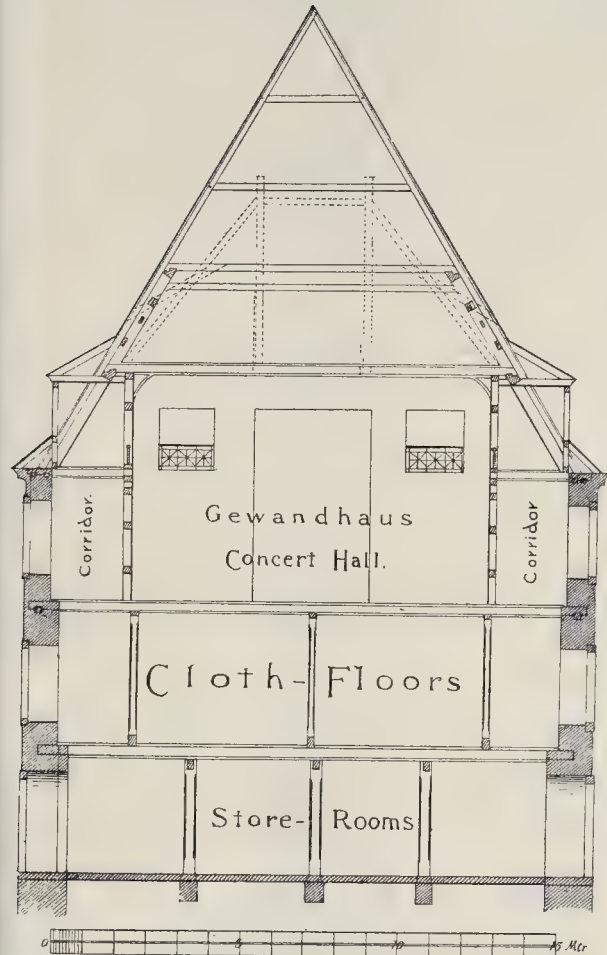
THE OLD "GEWAND-HAUS" CONCERT HALL, LEIPZIG.

 HIS long-celebrated music-room, in which many important concerts have been held and many great players have performed, and which was a kind of classic ground to lovers of music in Germany, as our old "Hanover Square Rooms" used to be in England, has recently been demolished.

The room was very peculiarly placed and constructed, and its acoustic properties were so notoriously satisfactory that it is of some interest to consider what was the cause of its success. The matter has been gone into by a German theorist, Herr Volkmar Müller, in the *Zeitschrift für Instrumentenbau*, and though we decline to adopt this writer's very positive opinion as to the secret of acoustic success in the construction of concert-halls, or at least as to the matter being solved by the old Gewand-haus hall, we are indebted to him for the facts, which are of some interest.

"Gewand" means "cloth" in German, and the "Gewand-haus" or "Cloth-house" concert-room was so known from the fact of its occupying an upper story in a building mainly used as a cloth warehouse. It is rather curious that the name, we understand, clings to the new concert-room which has been built to supply the place of the old one, though without the same reason in regard to its situation.

The old Gewand-haus dates back to 1498, and was long known as the "Zeug-haus," or armoury of the city. At fair times the lower parts served as store-rooms, and notably as cloth-floors for the merchants, the space under the high-pitched roof being used as a granary, and, later on, as a library. The Seven Years' War had disturbed the celebrated concerts which were begun under private enterprise in 1743, and J. A. Hiller, who was living at Leipzig at the close of the last century, renewed and carried them on at his own risk. There was not a building in the city fit to give good concerts in, and it was at the instance of the Duke of



Section of the Old Gewandhaus, Leipzig.

...eimar that in 1780 the architect J. F. Dauthe took the first steps with a view to remedy the evil. After examining the Zeughaus he submitted a plan for converting the space under the high-gabled roof and over the gallery into a concert-hall 40 ells long, 20 ells and 12 high (the Leipzig ell being then 1.856 mètre), proposing at the same time that, in order not to overweight the building, the walls thereof should be made not of masonry but of boards, and these lined with boards in winter-time. This plan was submitted on May 10, adopted by the Town Council on June 13, and the hall finished in November, 1780. The first concert was given in it on November 25, 1781. The form of the hall was an oblong, rounded at each end. Its excellent acoustic properties were generally, if not universally, attributed to its shape. Herr Müller urges that this was not due to the form only, but to the way in which the material used, and to the way it was put together. As will be seen from the section subjoined, the concert-room was a wooden building within a building. This wooden structure was built on the ceiling of the cloth-floor, which, in turn, rested on the store-rooms beneath. The main beams were carried by oak story-posts. The exterior construction of the hall is of course entirely of trussed wood-work, as indicated in the section, and the wooden lining of the concert-room was rounded off at the angle of

the ceiling and floor. That this should have been done shows an early perception of what has only been more lately recognised in English works on acoustic construction, that a right-angle between ceiling and floor gives rise to reverberations. Below the wooden floor of the concert-hall was the large and (apparently) unoccupied space of the cloth-stores; at least, Herr Müller speaks of this as an empty space below the concert-hall floor, and therefore we presume that it was to a great extent unused space; if it had been usually filled with bales of cloth, of course its condition as a reverberative space would have been very materially modified. Assuming this to be the case, we may accept to a certain extent Herr Müller's view that the old Gewandhaus Concert Hall may be likened to a violin. The inner roof or ceiling, and partitions, represent, according to him, the strings, and bridge; the ceiling of the cloth floor, with its transverse beams, forms the belly; the upright story-posts formed the sound-post and bass-bar; and the lower floor the "back" of the violin. All the parts of the room, therefore, were free to vibrate, no rigid walls or floors being in connexion with the actual concert-room anywhere. This analogy with the construction of the violin appears to us to be pushed a good deal too far in detail; but taken generally it is no doubt true that the sides, roof, and floor of such a room would re-inforce the sound of voices or

musical instruments in somewhat the same way that the body of a violin re-inforces the sound of the strings.

The satisfactory effect of the room acoustically was notorious, and rests on abundant testimony, and we agree that its construction and position are probably mainly accountable for this. Whether, on that account, it is to be concluded that we should adopt some such system in the construction of concert-halls, and sling, as it were, a wooden hall in the midst of a walled building, with spaces above and below and on each side of it, is more than questionable. In case of fire, it would be one of the most dangerous buildings that a large audience could possibly be in, and that consideration alone is sufficient to decide against any hasty adoption of such a suggestion, whatever we might expect its acoustic success to be.

NOTES.

THE Archaeological Society of Athens has been recently engaged in excavations in the island of Egina. Their work has been carried on at the (so-called) temple of Aphrodite, which is near the town itself. Parts of the foundations of this temple, and one column standing upright, still remain. Beneath the mass of earth and rubble on which the temple was built are remains of masonry of early Greek date, and still further down a deep layer of Mycenaean remains. The buildings in this lowest layer are unusually well preserved, and were probably private houses. A great quantity of rare fragments have come to light, some of them of a peculiar technique. M. Evetria, for the American director, Mr. Richardson, has done important work at and about the theatre. The west parodos has been cleared out, and near to this parodos the foundations of a small peripteral temple have been found; in front of it was an altar, and both were presumably dedicated to Dionysos. From Athens (through the *Berliner-Philologische Wochenschrift*) comes the news that Dr. Dörpfeld has discovered in the Dionysos Theatre there an underground passage similar to those already known at Eretria and Magnesia.

THE debate in the London County Council on Tuesday on the subject of the unification of London, as it is called, was purely academical. The matter is one for discussion in the House of Commons. The County Council may vote a dozen resolutions in favour of the amalgamation of the City with the rest of London, but the subject cannot be dealt with in this Parliament. What the view of the next Parliament may be no one can tell. When a scheme for the improvement of local government in London is brought in it will be proper to discuss it. At present the County Council are wasting their time when they spend the best part of two sittings over debating society speeches.

BOTH architects and engineers in Germany are giving much attention to the arrangements made for the opening of the North Sea-Baltic Canal, the former on account of the many interesting temporary structures to be erected in connexion with the various ceremonials, and the latter because of the risk to be run in taking so many warships and pleasure craft between the hardly-completed banks of the canal. It is not our intention to here refer to the history of the canal, but we must mention that the first sod was only cut in 1888, and that through traffic on the new waterway has only been possible for a few weeks. On the last trial trip the banks between Rendsburg and Bruensbuettel were certainly not found to be in a satisfactory condition. The opening ceremony proper will take place outside a memorial hall erected in connexion with the Holtenau Lighthouse, near Kiel. This hall is known as the "Three Emperor Hall." The in-

viz., the tower of St. Regulus at St. Andrews, one of the most interesting structures of that early period. The little chapel attached to it seemed to be more like Roman masonry than anything he had seen in this country. He would have confined himself almost to moving the vote of thanks, had not his father's name been mentioned by the lecturer, whom he had to thank personally for reminding them of what his father had done. He had been applied to for some time past to put together what he could of his father's professional life, and a remark made by Professor Baldwin Brown as to the detailed order observed in his book, recalled very much to his mind the conclusion he arrived at after reading through forty years of his father's diary—viz., that he was born an accountant and book-keeper, and that in taking up Gothic architecture he dealt with it in detail, as a branch of book-keeping. Every church examined by him was entered in the most careful manner, and there were great folio volumes, in which his father numbered the churches he had seen, with certain marks and indications attached to these numbers, to describe the component parts of each building, the whole looking like a series of office-books. Only within the last few months had it occurred to him what would be a far better illustration of his father's work with regard to Gothic architecture. It was well-known that the Colonists of Australia had been trying to grow the red clover, which would not flourish, because there were no bumble-bees there. The Colonists, however, imported the bees, and now the red clover flourished in the colony. Now his father was like a bumble-bee sipping the sweets of Gothic architecture, the honey was to be seen in his book, and another result was to be seen in the gradual and great increase of the practice of Gothic architecture, he having caused the impregnation of the red clover of Gothic architecture.

Mr. William White, F.S.A., seconded the vote of thanks. The paper they had had that evening was more a historical than a practical subject, but, at the same time it was a most interesting communication. He had seen numberless instances in the country, and little scraps of buildings, which could be hardly associated either with Roman or with Norman architecture. There was one special subject on which the Professor's learning might be brought to bear with a little further observation, namely, as to the history of the discoveries which had recently been made in the chancel at Durham. Canon Greenwell seemed to insist positively on the remains not being those of the earlier church of Aldhune, but the later one of Carleph. He (the speaker), however, could not help thinking that they were the remains of the earlier church. The only argument brought forward by the Canon, as a simple and most telling one, was that it was not at all likely that the builder would have pulled down Aldhune's earlier church until his own was finished. He (the speaker) would rather be inclined to base the matter on architectural evidence. In Norman times it was known that they paid very little attention to their foundations, and it was most probable that this building of Carleph's was built on an insecure foundation. It was said that it fell to pieces, and, if so, there was reason to suppose that the foundation was bad. They might safely conclude that the earlier church was built upon a good and safe foundation, it having stood many centuries before being rebuilt. He could not help thinking, therefore, that Aldhune was the builder of the remains which had been discovered.

Mr. R. Phené Spiers remarked that the subject formed part of a study which was occupying attention in England and foreign countries. The influence of different schools in Italy, and particularly of the Byzantine school, was occupying the attention of many antiquaries. He was in hopes that they might have had that evening with them some of the members of a German Society who had just come over to England, and who might have explained why the German Romanesque work is practically unillustrated. They would all agree that the Saxon was not a style, but was simply an attempt to carry out, from descriptions of the monks and others who came over here, features which existed in Italy. He was glad to see that Professor Baldwin Brown adopted the view of describing the projecting strips at Earl's Barton and other places, not as attempts to copy timber work, but as an attempt to imitate as far as possible the arched wall-decorations of the Italians. He had pointed out that there were two influences exerting themselves on the work, namely, the influence of the early Celtic Church, and the influence of the Roman Church. There

were certain features belonging to the former, such as the square east end, found at Bradford and Dover, which was peculiarly a national form, and but rarely found abroad. It was a singular fact that, although the apse was introduced at various times by the Roman missionaries, and after the Conquest was to be found at the east end of all our Norman cathedrals, the English afterwards returned to their own favourite square east end. Then, again, the transepts, as at Dover and Worth, were not of the same height as the nave, as were the examples of St. Peter's and of St. Paul's at Rome. Then there was the west tower, another English characteristic to be found in Saxon churches; and the central tower, which was not possible in a basilican church, and which was found frequently in our early churches. These were features which might be attributed to Celtic influence, while to the Romans might be attributed the basilican plan and the apse. The Byzantine influence might have exercised considerable effect. It was a singular fact that the churches at Brixworth and Wing both had polygonal apses, which were always found in Byzantine churches. There was another trace of Byzantine influence shown by the considerable amount of interlaced sculpture found throughout the East. A very large number of tombs were carved with this ornament, and with the early Celtic ornament, some of which was of such a beautiful character that it seemed impossible to have been executed by Saxon workmen. Perhaps the most finished example of Saxon architecture in this country was that at Bradford-on-Avon. With regard to the long and short work, he had not been able to find examples of that abroad. He believed that the circular piers at Christ Church Cathedral, Oxford, and Waltham Abbey, which were considered to have been of pre-Conquest origin, might be of Saxon origin. They found the same forms at Gloucester, Tewkesbury, Durham, and other places, and these, he believed, might be really attributed to Celtic influence.

Mr. John Slater wished to add a word of appreciation of the interesting paper they had had. Thanks were specially due to Professor Baldwin Brown, for, as a matter of fact, he had stepped into the breach and had taken the place of another lecturer. He did not know that he had ever listened to a more suggestive paper, and he had been particularly struck with what had been pointed out as to the immense antiquity of the village life of this country. It had come upon him almost as a surprise to think that it was probable that in many of these small villages they had almost in their exact position all the surroundings which were there in remote times. One could not help noticing that in some of the small villages cruciform churches did not exist at all. In the case of a church near Macclesfield, it was evident that the nave and a small piece of the chancel were the remains of a small Saxon church, the walls having been taken down and the aisles added. He believed there was a polygonal apse in Germany to be seen at the little ruined abbey of Heisterbach, near Königswinter.

The vote of thanks was then put and carried by acclamation.

Professor Baldwin Brown replied, and said how interested he had been to hear some personal reminiscences of Mr. Thomas Rickman. He never read Mr. Rickman's book without fresh wonder at the diligence and amount of travelling he managed to get through, in days when it was not so easy to move about the country as it now was. One could remember that his book, published first in 1813, had never been superseded, but remained the text-book of English architecture to this day. He would not attempt to enter into the great Byzantine question, or the question about the long and short work. He attached considerable importance to the use of long and short work in tower and window openings, before it was used for the corner.

The President stated that the next meeting would be held on Monday, June 10, when a business meeting would be held for the election of the Council and the Standing Committees for 1895-6, and for the election of candidates for membership.

The proceedings then terminated.

PREFERENTIAL RAILWAY RATES ON FOREIGN GOODS.—The Mansion House Association have invited a conference of public authorities and commercial and agricultural traders, to be held at the Mansion House on Tuesday next, to consider this subject. Tickets for admission can be obtained at the offices of the Association, Eastcheap House.

ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.

A WESTERN Counties district meeting of the members of the Incorporated Association of Municipal and County Engineers was held at Plymouth on Friday and Saturday, May 17 and 18. The members of the Association received the most hospitable welcome on their first visit to the great Western seaport, and the meeting proved one of the most successful of the series of district meetings held this year.

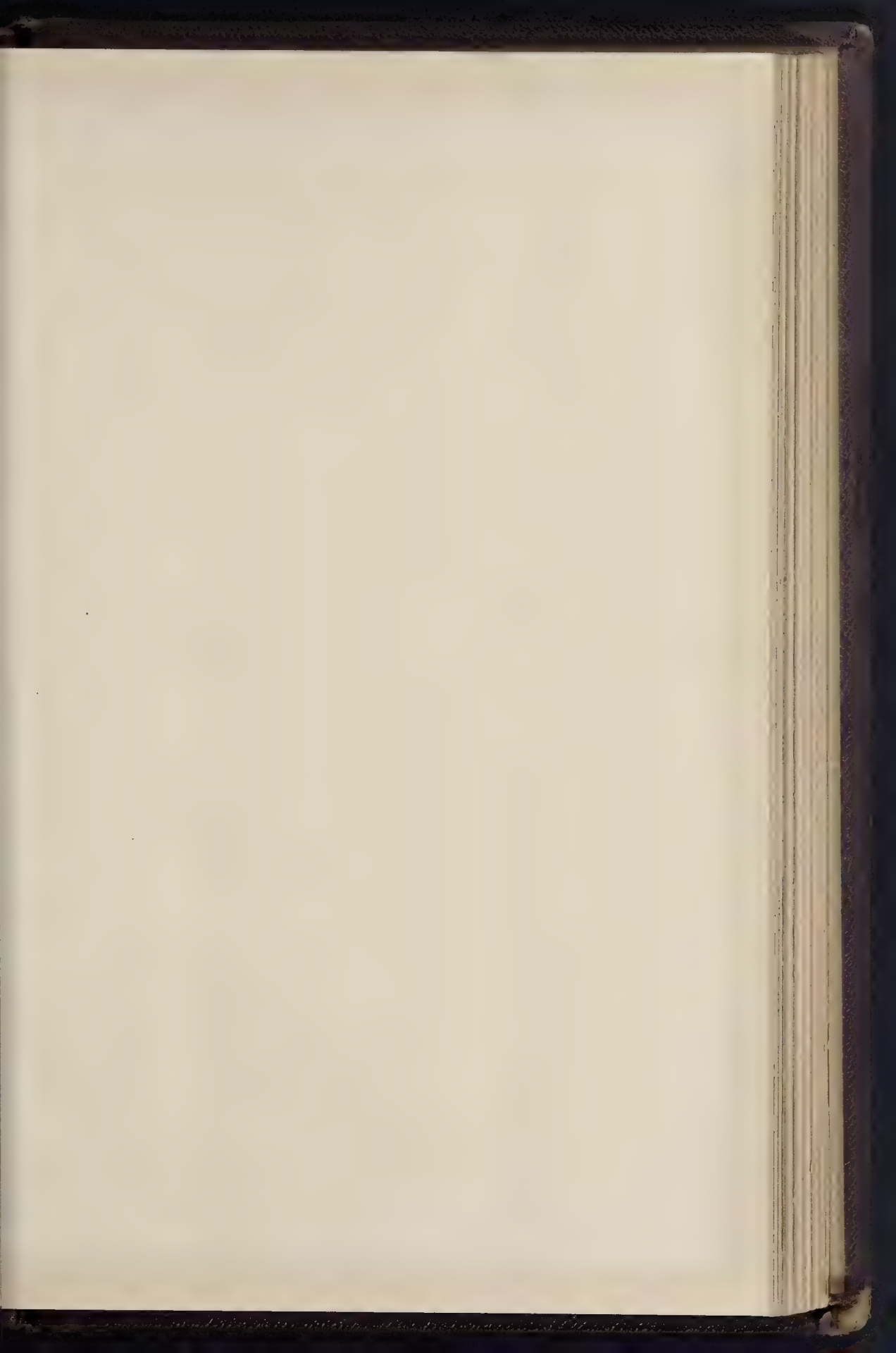
The members of the Association attending the meeting were received in the Council Chamber of the Municipal Buildings by the Mayor (Mr. W. Law) and other members of the Corporation.

The Mayor said that Plymouth had taken her part as a naval and commercial town, and had now in progress works of great engineering interest. The watershed on the confines of Dartmoor was one of the finest in the country. The progress of Plymouth in recent years had been most marked, and would compare favourably with the northern towns.

The President thanked the Mayor for the very generous welcome extended to the Association, and said it was a great pleasure to visit so ancient and historic a town as Plymouth.

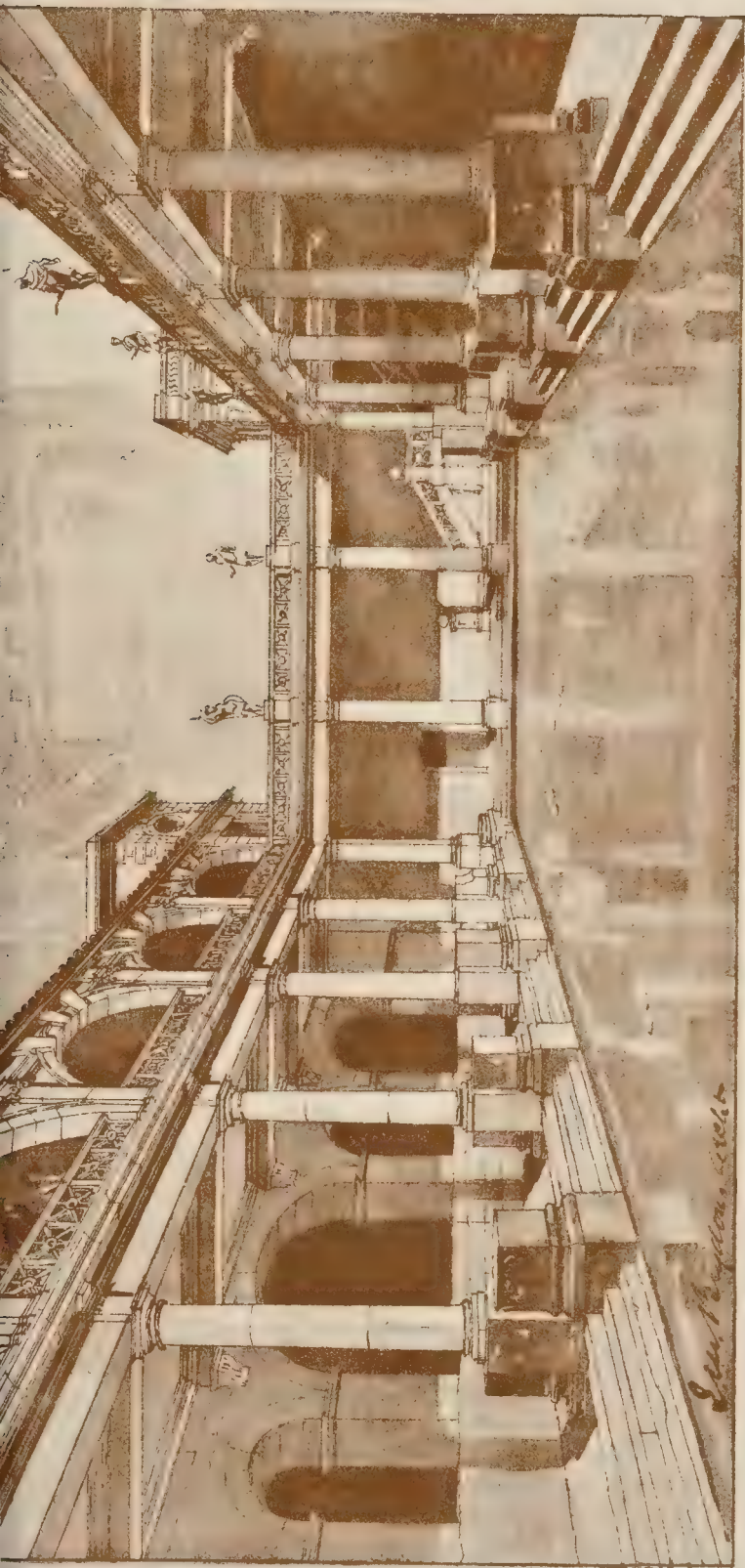
An adjournment was then made to the Western Law Courts for the reading and discussion of papers on the public works of Plymouth. The President (Mr. A. M. Fowler, C.E., of Manchester) presided, and amongst those present were Messrs. J. Paton (Borough Engineer, Plymouth), E. Sandeman (Water Engineer, Plymouth), J. P. Barber (Islington), J. L. Hodge (Plymouth), C. Jones (Teignmouth), E. Sykes (Cneadale, Cheshire), R. M. Gloyne (Eastbourne), Lieut. Col. Jones, V.C. (Westminster), M. G. Stringfellow (East Stonehouse), J. Parker (Nottingham), L. Stevens (Newton Abbott), A. C. Hodge and A. W. Debenham (Stonehouse), W. Jennings (Lambeth), H. J. Pearson (Lambeth), J. M. Masley (Redruth), W. Humpherson (Newton Abbott), W. H. Tressider (Falmouth), J. T. Hawkins (Somerton), and others.

Mr. J. Paton, C.E., Borough Engineer and Surveyor, read a paper on Plymouth and its Municipal Works. He said that from the year 1540 to the present time—a period of over three and-a-half centuries—the borough had grown from a small fishing town into one of the most important ports in England, and a busy commercial centre. The Municipal history of the town was of great interest from the fact that it was the first borough in England to be incorporated by statute. The borough occupied the southern slope of the foot of the Dartmoor hills and stood upon the slate and limestone of the middle Devonian series, rising to an average height of 100 ft. above sea-level. The area of the borough was 1,497 acres (including Drake's Island); of this area about 260 acres represented water area and land not available for building purposes, such as Government establishments, parks, &c. The population of 1895, according to the Registrar-General's returns, was 89,096, and the estimated number of houses, 10,979. The density of population for the whole borough in 1891 was fifty-nine persons per acre, which was equal to 8.74 persons per house. The figures varied considerably according to the character of the locality. In St. Andrew's Parish it was equal to 9.5 persons per house; in Charles' Parish to 7.8 persons per house. The rateable value of the borough was 315,300*l.*, and the total local rate for the past year 6*sd.* in the *£*. The local debt of the borough was 335,912*l.* The length of streets, roads, and lanes repairable by the Corporation was forty-six miles five furlongs. The footways of the streets were flagged with various kinds of material, including limestone granite, and Caithness flagging, Coverack concrete slabs, Limer asphalt and tar paving. The expenditure on highways during the past year was 6,508*l.* 12*s.*; street-watering and cleansing 6,327*l.* 6*d.*; sewers, 974*l.* 11*d.*; and street-lighting, 4,664*l.* 7*s.* 7*d.* Wood-block paving had been used in Plymouth to a considerable extent for the carriageways of the leading thoroughfares in the centre of the town. The first wood paving laid down in Plymouth was during 1879, and this was renewed in 1886, making the life of the paving seven years. The cost of construction and renewal was 19*s.* 4*d.* per yard for a life of fourteen years. The timber used in this and other instances quoted, was red deal dipped in creosote. The blocks used in subsequent works were 7-in. by 3-in. by 5-in. deep, white Baltic saturated with creosote oil, equal to 10 lbs. per cubic foot. The paving was laid on a solid bed of Portland cement concrete 6 in. thick, the surface being floated over with fine stuff.



THE BUILDER MAY 25 1895





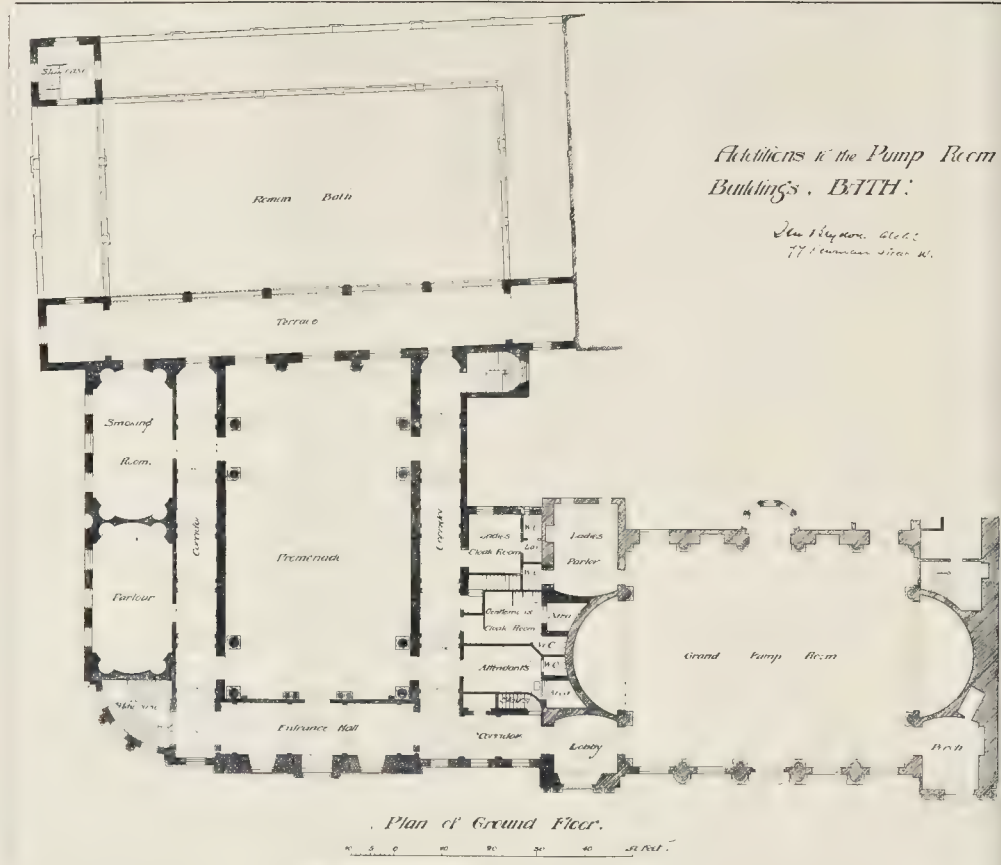
INTERIOR OF ROMAN BATH, BATH AS INTENDED TO BE TREATED — MR J M BRADON F R I B A , ARCHITECT

to form an uniform and smooth surface. The blocks are laid hard upon the concrete in courses at right-angles to the line of traffic with 1-in. joints. The joints had been treated in two ways. First, by running an asphaltic mixture into them for about 1 in. in depth, and then filling up the remaining space with cement grout; and second, by running in sufficient grout to secure and steady the blocks, then racking the joints with limestone, gravel, and grouting, with asphaltic mixture. Sufficient time was allowed for the cement foundation to harden before the blocks were laid down, and where the joints were grouted with cement a period of seven days should elapse before the traffic was allowed to pass over the paving. One of the advantages of asphaltic grouting over cement grouting was that the traffic could be passed over the wood paving immediately after completion. From the experience gained in Plymouth the life of soft wood paving might be taken as varying from ten to twelve years, according to the width of the street and character of the traffic. In repaving Old Town-street, Bedford-street, Ebrington-street, and Ham-street, the Works Committee had favourably considered the recommendation, subject to inquiries being satisfactory as to hard wood not being more slippery than soft wood. The sewerage of the borough had received the constant and careful consideration of the Council for some years past, and presented the most difficult problem in connexion with the sanitary administration of the town. On December 22, 1887, Mr. Baldwin Latham, C.E., reported to the Corporation on the sewerage of Plymouth. The report dealt exhaustively with the difficulties of the question, and recommended the carrying out of certain works to prevent flooding in the low-level districts of the town, and the improvement of the outfalls by the construction of new intercepting sewers, at an estimated cost of 24,000*l*. In March, 1890, Mr. G. D. Bellamy, then Borough Engineer and Surveyor, reported on this important question, and placed before the Council a scheme, which was approved. The objects of Mr. Bellamy's scheme were (1) the discharge of as much as possible of the sewage southward of the citadel into the strongest tidal current; (2) to diminish to the smallest practicable extent the passage of high level sewage through the low level sewers to prevent the flooding of the low level districts; (3) to minimise the discharge of sewage into the Cattewater. Part of Mr. Bellamy's scheme was being carried out in accordance with his designs, and under his supervision, at a cost of 30,000*l*. In October, 1894, Mr. Jas. Mansergh, C.E., was called in to advise the Corporation before any further expenditure was incurred, and Mr. Mansergh's report and scheme was unanimously adopted by the Council. The estimated cost of carrying out this scheme was 100,000*l*. The borough was divided into six drainage areas, the outfalls for all the districts being tidal. As might be expected in an old town, many of the old sewers were of an obsolete character, and he was now preparing a scheme for the reconstruction of these subsidiary sewers. For the purposes of street cleansing the borough was divided into one night district and three day districts. Plymouth, like many other ancient boroughs, contained within its boundaries considerable areas of slum property, densely populated by members of the labouring-classes. The question of dealing with unhealthy areas and houses unfit for human habitation was always a difficult one, and in Plymouth this difficulty was accentuated by the fact that the poorer classes had been accustomed for the past three centuries to crowd into tenements. Some idea of the overcrowding in the old part of the town might be gathered from the fact that the area of the borough originally enclosed by the old walls contained a population of 6,000 persons in the year 1625, and this area was now populated by about 20,000 persons. In his opinion the cause of the overcrowding was the excessive rental occasioned by the high price of land. On October 28, 1891, the Medical Officer of Health (Dr. F. M. Williams) made a representation to the Sanitary Committee under the Housing of the Working Classes Act, 1890, that within the area bounded by Looe-street, Howe-street, Buskwell-street, and Vauxhall-street, were houses, courts, and alleys, the narrowness, closeness, and bad arrangement of which, together with the want of light, air, and ventilation, were dangerous and injurious to the health of the inhabitants of the buildings, and the Committee resolved to forthwith prepare a scheme for improving the same. A scheme was submitted to and approved by the Sanitary Committee on

September 29, 1892, which was shortly as follows:—(1) Land and houses within the limits of the area to be taken and purchased compulsorily under the provisions of the Act; (2) All the houses within the limits of the area to be pulled down and the sites cleared; (3) The whole of the area to be utilised in part for laying out improved streets and approaches, and in part for the erection of dwelling-houses for the working classes with suitable air spaces and conveniences; (4) The displaced population to be provided with suitable dwelling-houses, either temporarily or permanently, as might be found necessary, on land to be purchased at Prince Rock. The number of houses in the condemned area was 63, with a population of 813, or 12.90 persons per house. A provisional order confirming the scheme was confirmed by an Act on June 29, 1893. Twenty-nine acres two roods of land had been purchased at Prince Rock to provide for the displaced population of the condemned area, and for the population disturbed by the widening of Ebrington-street, Ham-street, and Southside-street, and for other town purposes. The area proposed to be dealt with immediately was 9 acres 3 roods, the remainder being as yet unappropriated. Competitive designs were invited for the erection of dwelling-houses on the condemned area and on land at Prince Rock, and that of Messrs. Hine & Odgers, of Plymouth, for dwellings, estimated at a cost of 33*l*. per cube foot was adopted. The cost of the land purchased at Prince Rock was 19,097*l*, and the Corporation now contemplated expending 23,400*l*. in the erection of buildings and laying-out of new streets, to provide for the displaced population in Howe-street and Looe-street. The houses to be taken in hand at an early date, and erected as might be found necessary, were as follows: sixteen five-roomed houses, estimated rental, 5*l*. 6*d*. per week; sixteen four-roomed houses, 4*l*. 6*d*. per week; six five-roomed flats, 4*l*. 5*d*. per week; forty four-roomed flats, 3*l*. 6*d*. per week; twenty-six three-roomed flats, 2*l*. 9*d*. per week. Messrs. Hine & Odgers estimate that the revenue based upon the rentals mentioned would be equal to 4*l*. per cent. upon the capital expenditure. He was now proceeding with the construction of the sewers and the formation of the new roads at Prince Rock, and no doubt building operations would be commenced this year. The tramway undertakings were originally in the hands of two companies. In 1892 the Corporation was impressed with the desirability of acquiring the tramways of the first company for the benefit of the borough on the following grounds:—the removal of a very great public inconvenience which had been caused by the manner in which the company had executed its work and conducted its business. After a considerable amount of negotiation, the undertaking was purchased by the Corporation under the powers of the Plymouth Tramways Act, 1892, for 12,500*l*, the length of lines being 3.50 miles. The Tramways Sub-Committee purchased six new cars at 119*l*. per car, and from the old company six of their best cars, four at 80*l*., and two at 35*l*. The experience gained by the working of the tramways induced the Council to double the line from Sherwill Chapel to Compton, which work had been carried out to the great advantage of the public. There were two depôts, and the stables accommodate 81 horses. The total capital expenditure on all accounts was 41,903*l*. 8*s*. 6*d*., and taking the mileage the total capital expenditure was 4,325*l*. less per mile than the average in England and Wales. The working of the tramways by the Corporation had resulted in a loss which amounted to 1,150*l*. up to March, 1894, and this debit balance was now increased to 3,265*l*., the actual deficit on the last year's working being 1,297*l*. The deficit on revenue account would, in his opinion, be entirely wiped out when the tramway system was completed and the Compton and West Hoe lines were connected. There was no reason why the undertaking should not be self-supporting, and in time contribute towards the relief of the rates. The foundation of the tram-track was formed with Portland cement concrete, 6 in. in thickness. The rails were of best Bessemer steel, 6 in. deep, and were fixed to a gauge of 3 ft. 6 in. The track was paved with granite setts, racked with limestone gravel, and grouted with an asphaltic mixture. He had prepared plans for extending and connecting up the tramways system in the borough, at an estimated cost of 12,000*l*. The town was well supplied with parks and recreation grounds, the most important of which was the Hoe. The Hoe, in the early history of Plymouth, formed part of the waste of the Manor of Sutton, and as such belonged to the Corporation, and one of the

oldest rights connected with it was that of the fishermen to spread their nets on it for the purpose of drying them. As a marine promenade the Hoe was unequalled in England. In the last ten years the Corporation had spent 140,278*l*. in street improvement works. The public buildings the property of the Corporation included the Guildhall and Western Law Courts, Municipal Offices, Free Library (old Guildhall), Theatre-Royal, Royal Hotel, Borough Lunatic Asylum, markets, &c. The first grant to hold a market in the town was about 1253. In 1882 the Corporation accepted the design of Mr. C. King, architect, for the re-erection of the market buildings at an estimated cost of 35,000*l*. The expenditure to which the Council was committed in re-erecting the markets was 43,546*l*. and it was further contemplated to re-roof the Poultry, Vegetable, and Fish market at an estimated cost of 12,000*l*.

Mr. E. Sandemann, Assoc. M. Inst. C.E., read a paper on the water supply of Plymouth. He said that, unlike many of the large waterworks of the country, those of Plymouth had belonged to the town since their commencement. The first Act giving power for the construction of works of water supply was passed as far back as the year 1585, in the reign of Queen Elizabeth. Under it the Corporation made a dam across the headwaters of the river Meady, and cut a water-course, called locally a leat, from thence to the town. The total length of the leat between its commencement at the weir on the Meady and its termination at the point of discharge into the Sound at Millhay was 18½ miles, whilst the distance in a straight line was 10½ miles. The work was done under the superintendence of Sir Francis Drake, who appeared to have served his country well in more capacities than one. The area within which the Corporation of Plymouth had the right to supply water was very considerable, and comprised 59 square miles, whilst the area of the borough itself was only 2.2 square miles. The supply was by gravitation entirely, and the works as they now existed were (1) the weir on the river Meady, known as the head weir; (2) the portion of the leat between the head weir and Roborough reservoir, 8 miles in length; (3) Roborough reservoir, containing one million gallons, at an elevation of 547 ft. above sea-level, with connecting main to Crown Hill reservoir; (4) Crown Hill reservoir, containing 1.3 million gallons, at an elevation of 368 ft., with connecting main to Hartley reservoir; (5) Hartley reservoir, containing 7½ million gallons, at an elevation of 316 ft., with connecting main to Drake's-place reservoir, containing 3.6 million gallons, at an elevation of 146 ft. The total length of distributing mains was about 84 miles. The gathering ground was 4,885 acres, or 7½ square miles in area. It was situated on the western slope of Dartmoor, which was a large moor of granitic formation, lying at a considerable elevation, and occupying an area of, roughly speaking, 25 miles by 15 miles. The average annual fall of Princetown (at the Northern extremity) was 80 to 90 in., while at the Head Weir Cottage (at the southern extremity) it was only 59 in. The average rainfall on the whole gathering-ground was 65 in. The total yield of the gathering-ground on the basis of three dry years would be equivalent to more than 2 million gals. per day. As the consumption of water in the town at present was only 4 million gals. per day there would be no necessity to look for an additional area of supply for some time. The greatest difference in level between the houses supplied was nearly 600 ft., and it was on this account that a series of reservoirs had been made between Roborough and Drake's-place, to supply the intermediate levels. In order to supply outlying districts, the levels of which varied greatly, and for which it was too expensive to build service reservoirs, it had lately been found necessary to fix pressure-reducing valves. Two had also been fixed in the town to reduce heavy pressures in low-lying districts from 130 lbs. per square inch to 80 lbs. The consumption of water in the year 1891 was 5½ million gals. per day, or 58 gals. per head, and owing to the excessive waste it was resolved to divide the whole of the town into districts, and place waste-detecting metres on the mains. At the present time the consumption was 4 million gals. per day, or 43 gals. per head. The population supplied was 93,000. The trade supply was above the average, being 10 gals. per head. Probably the low price charged for water for trade purposes, viz., 2*d*. per thousand gallons, was conducive to the use of a larger amount than would otherwise be the case;



*Additions to the Pump Room
Buildings, BATH:*

*See May 1895, p. 466.
77/1 Commercial Street, B.*

owing to the fact that the water was taken directly from the river, and was delivered to the consumers without filtration, and without having been improved by being stored in large reservoirs, the deposit in the distributing pipes was very great. For many years past the question of improving the supply to the town by constructing a large storage reservoir, and by laying pipes to take the place of the open lead, had occupied the attention of the Corporation. The late Mr. Thos. Hawksley, who was Consulting Engineer, prepared plans for a reservoir, to be known as the Head Weir Reservoir, for which Parliamentary powers were obtained in 1887. Before letting the contract for the dam trial pits were made across the valley, and it was then found that a layer of decomposed granite covered the bottom of the valley to a considerable depth, one trial pit reaching a depth of 100 feet without rock being found. On these facts being known, it was decided to abandon the site, and Mr. Hawksley proposed that power should be obtained to build a reservoir several miles higher up the valley at the junction of two streams. The Parliamentary plans were prepared in November, 1889, when a controversy arose between two sections of the Council with reference to the two sites. A poll of the town was taken in March, 1890, and the Harter scheme was thrown out. In July, 1890, he (Mr. Sandemann) was appointed Water Engineer, and in December of the same year he presented a report to the Water Committee, recommending—(1) the construction of a service reservoir $\frac{1}{2}$ of a mile lower down the valley than the proposed Head-weir reservoir, and (2) the laying of a line of 25-in. iron pipes from the proposed reservoir to Roborough, a distance of $4\frac{1}{2}$ miles. The report was adopted after the opinion of Mr. J. Mansergh had been taken with regard to the engineering features of the scheme, and after a report from the late Mr. Wm. Topley on the geology of the site of the dams. An Act of Parliament was obtained after considerable opposition, and on August 9, 1893,

the works were commenced, the Corporation having decided to lay the pipe-line and excavate the trenches for the dams themselves. The pipe-line was laid as nearly straight as was compatible with economy. The pipes formed an inverted syphon, the hydraulic mean gradient of which was 1 in 334. They were capable of delivering 10 million gals. per day when the reservoir was full, and $7\frac{1}{2}$ million gals. per day when just kept fully charged, with 2 ft. of head on the inlet pipe. Air-valves were fixed at all the elevated points, and sluice-valves, provided with 6 in. by-passes, every half-mile. The reservoir, which was now in course of construction, was known as the Burrator reservoir. It would cover when completed an area of 116 acres. Its length would be 11 miles, and its greatest breadth half-a-mile. There would be two dams, one 120 yards long, and 77 ft. high, and the other 160 yards long, and 17 ft. high. There were many irregular joints in the surface rock, but the bed rock had a solid appearance. The principal difficulty in this trench were the vertical seams of soft material which appeared to have been originally open joints in the rock. The largest of the seams had been followed down for some distance, and it gradually narrowed to very small dimensions. The others had become watertight. The reservoir when completed would contain 651 million gals. The total estimated cost of the works was 150,000l.

The President, in opening a discussion on the papers, expressed a preference of hard woods over soft woods for street paving, for sanitary reasons, durability, and the reduction of wear and tear to a minimum. He believed that cheap omnibus fares in London, and other large towns, were mainly due to the introduction of wood paving, which had increased the life of the horses, and had reduced the wear and tear of the vehicles.

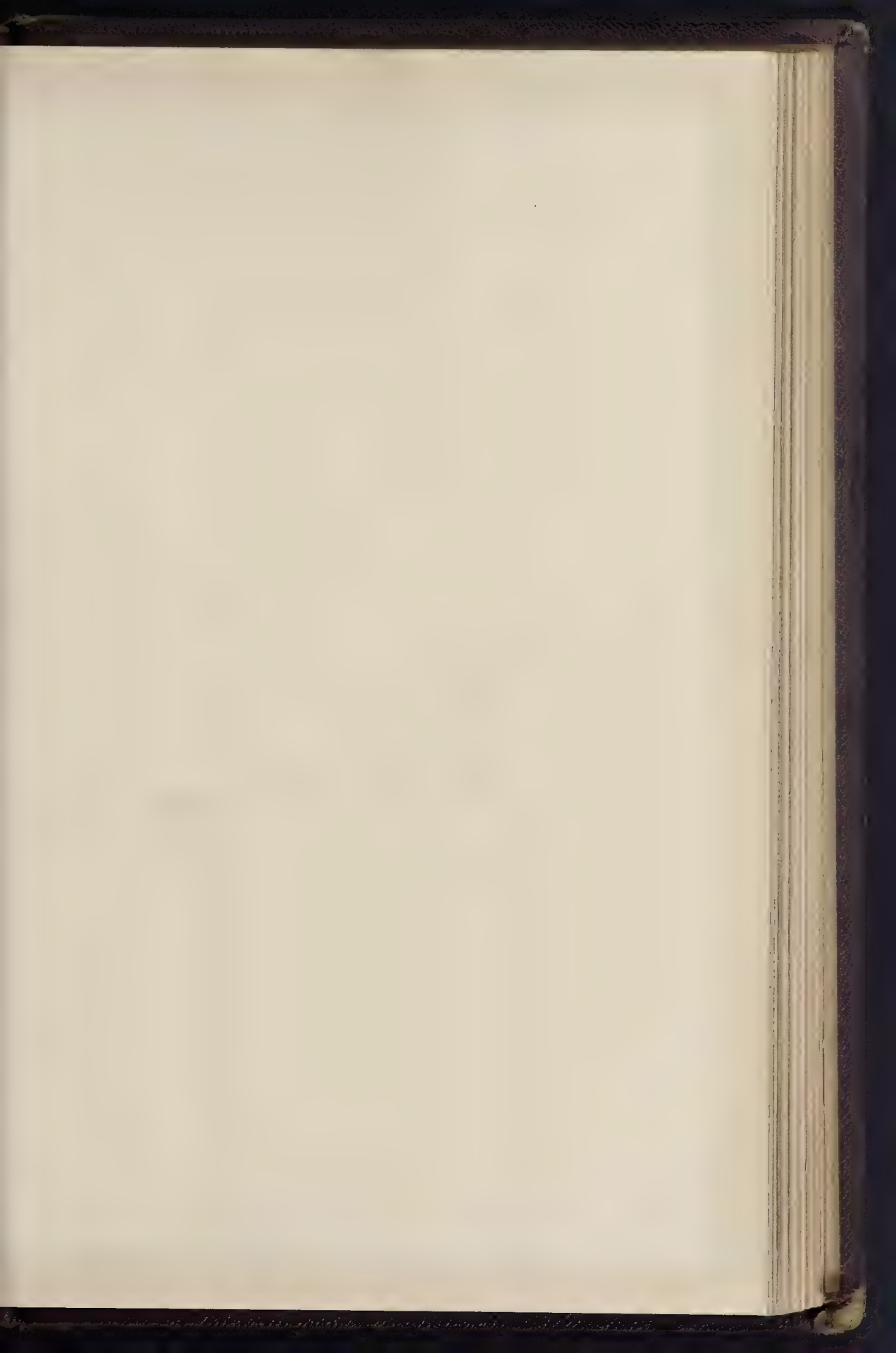
Mr. J. P. Barber, Islington, proposed a vote of thanks to the authors of the papers, and asked as to the wearing capacity of white Baltic timber, as compared with red, for street paving. As to

the scheme for housing the working-classes, he considered Plymouth fortunate in getting an estimate at so low a price as 33d. per cubic foot for buildings of the class proposed to be erected at Prince Rock. He did not know whether the explanation was that labour and material were cheaper in Plymouth than elsewhere, but he thought they would be fortunate to carry out the scheme at that price. Speaking of Mr. Sandemann, he congratulated him, and the Corporation which had his service, upon the evenness of the gradient at which the water-pipes had been laid. As a result he had saved a large number of air valves, and had experienced no difficulty with air in the pipes. He asked Mr. Sandemann how he proposed to deal with the fissures in the rock at the Sheepstor dam.

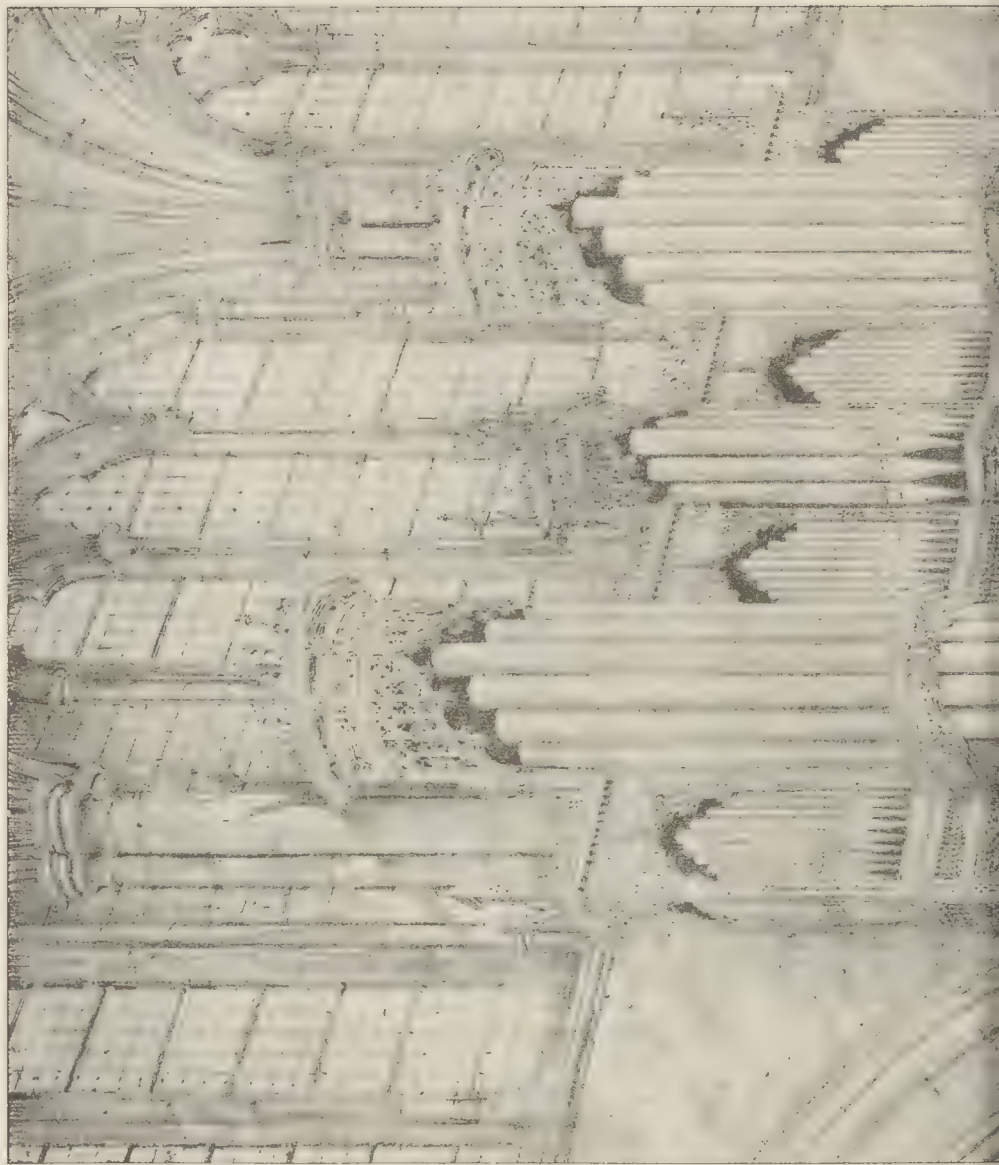
Mr. Gloyne, Eastbourne, who seconded, asked if it was the intention of Plymouth to introduce the incandescent gas-light in the streets. He had recently lighted the main road leading from the station at Eastbourne with incandescent lamps. The first cost was heavier, but they obtained a much better light from the consumption of a smaller quantity of gas. The cost of renewals of mantles was in some cases heavy, but the main cause of breakage was the vibration of the traffic and not the exposed position of the lamps.

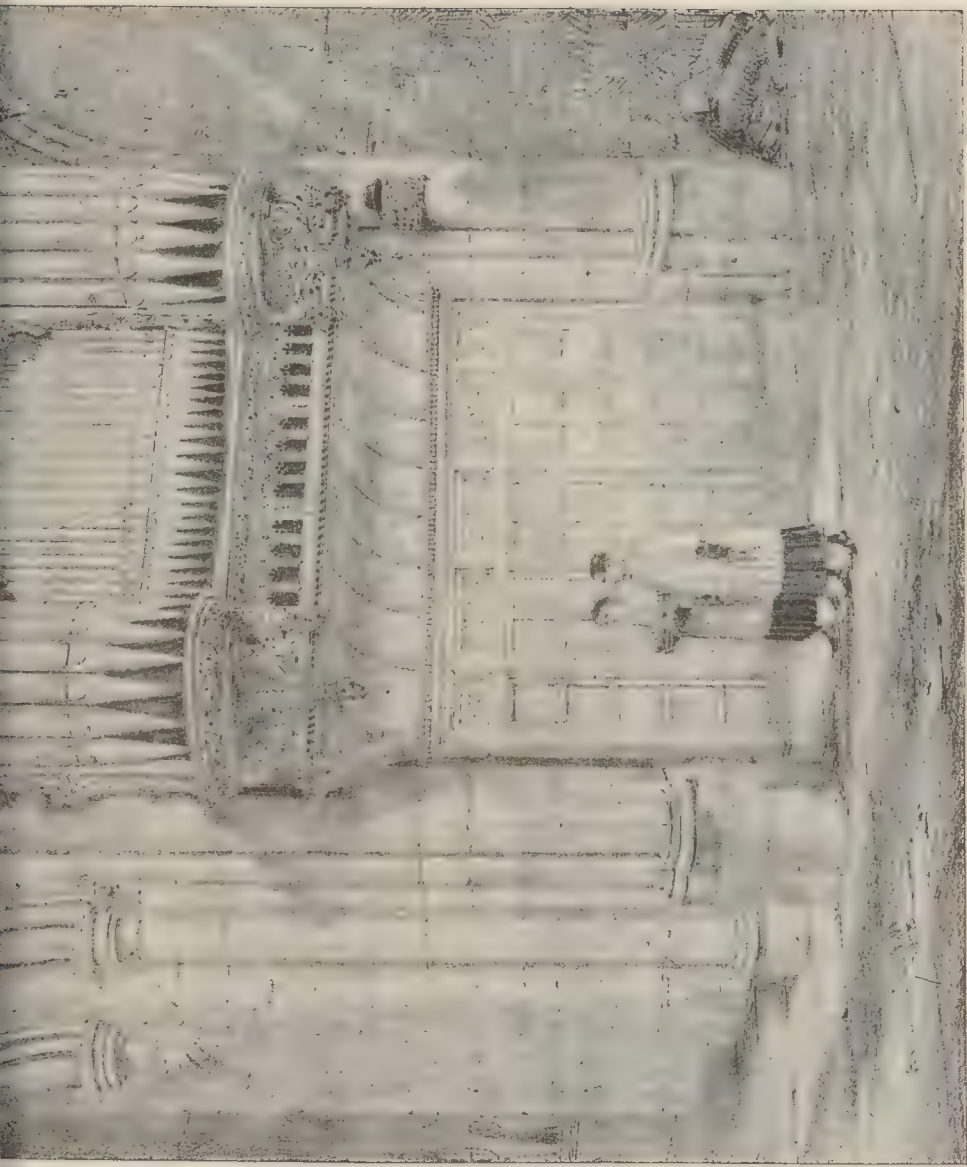
The vote of thanks having been accorded, Mr. Paton, in reply, said that his experience of the white Baltic timber, as compared with red for street paving, was favourable to the former. As to the cost of the workmen's dwellings scheme, the estimate of 33d. per cubic foot seemed low, but Messrs. Hine & Odgers, the architects, had a wide experience in Plymouth, and their estimate might safely be taken. Since the plans had been prepared, however, alterations had been made which slightly increased the cost per cubic foot. The question of adopting the incandescent gas-light for the street lamps was raised at the last Council meeting. But the Council would hesitate to adopt it as they were considering the desirability of introducing the electric light.

Mr. Sandemann, in reply to Mr. Barber's

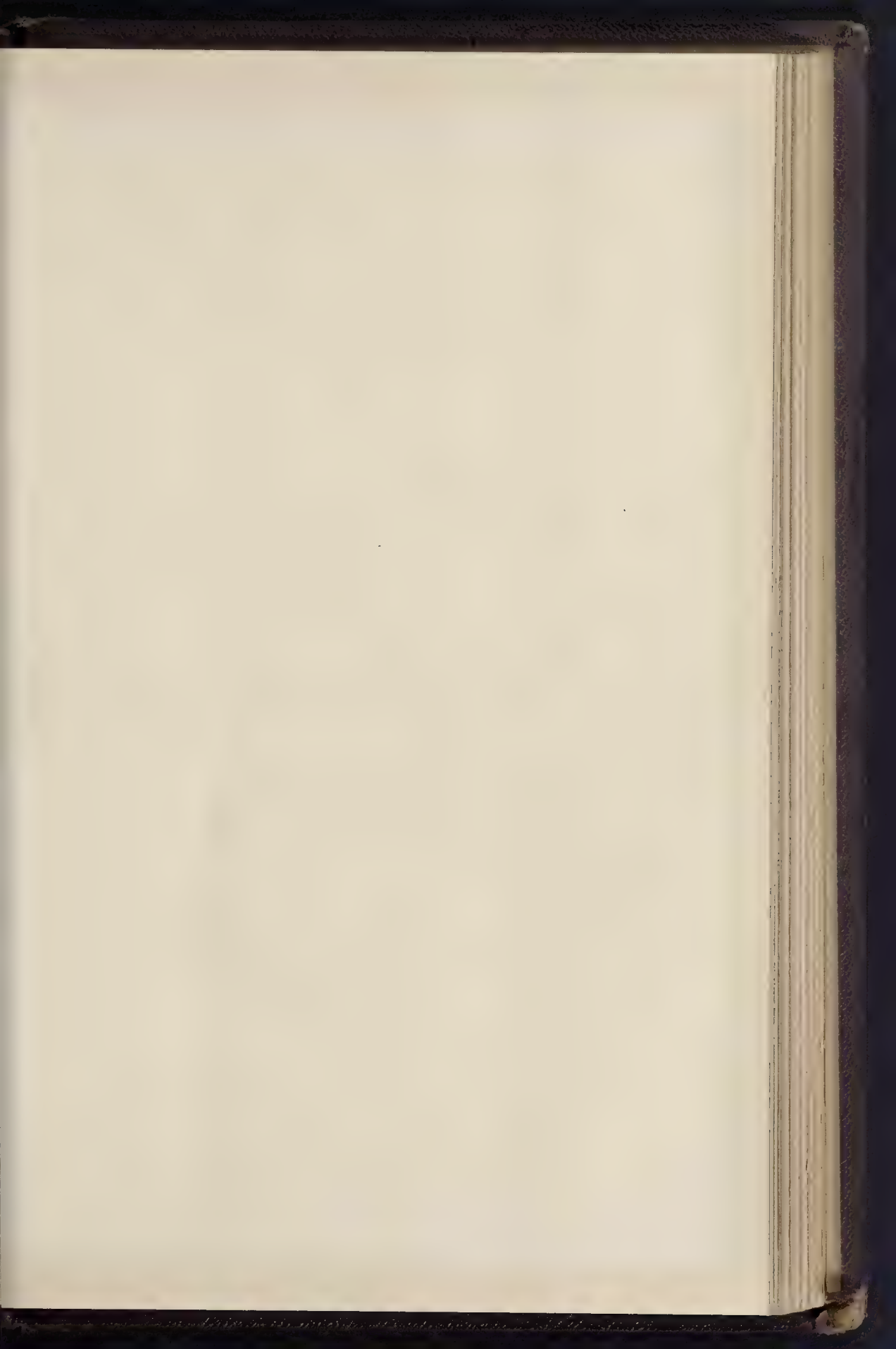


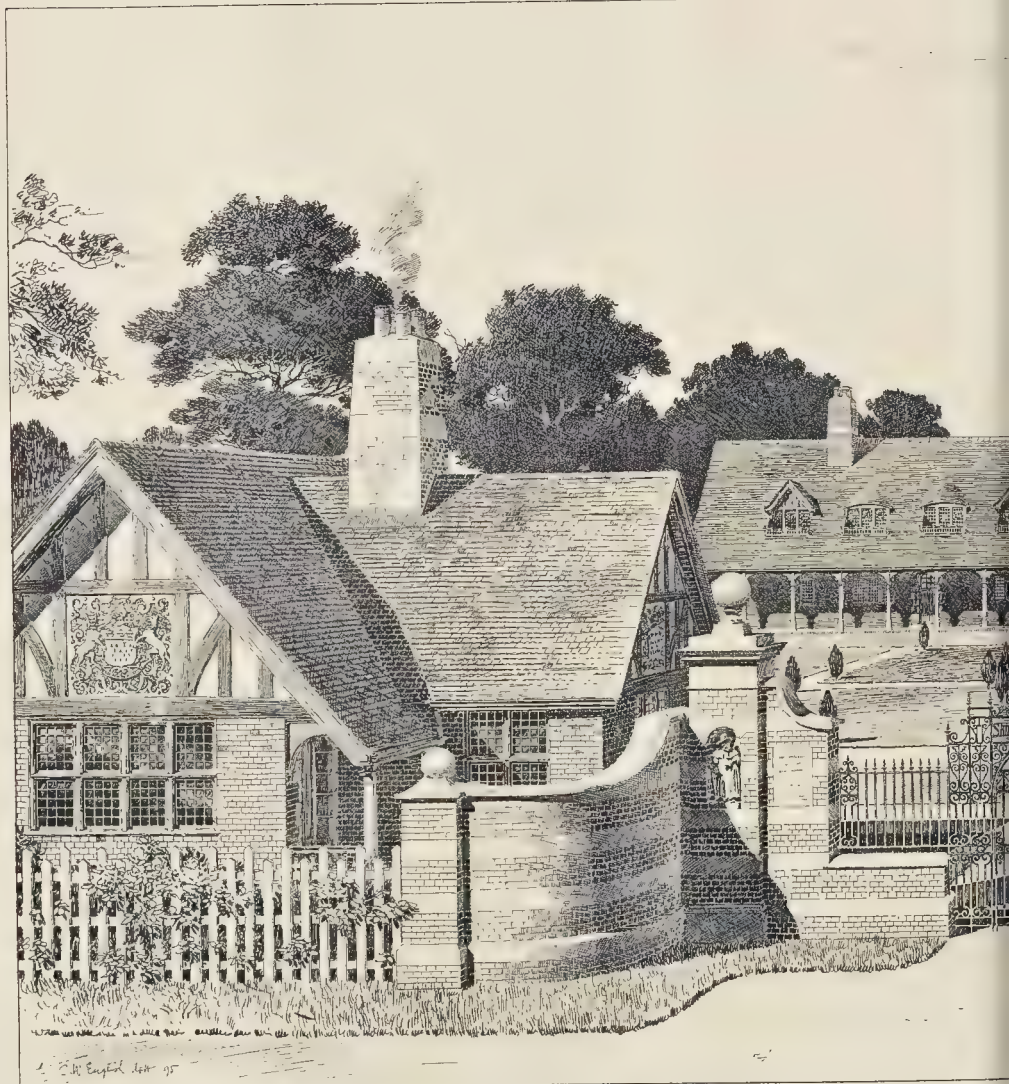
THE BUILDER, MAY 25 1895





ORGAN CASE, SOUTH TRANSEPT ST. SAVIOUR'S CHURCH, SOUTHWARK. SEE ARCHER W. BLOMFIELD, A.R.A., ARCHITECT.



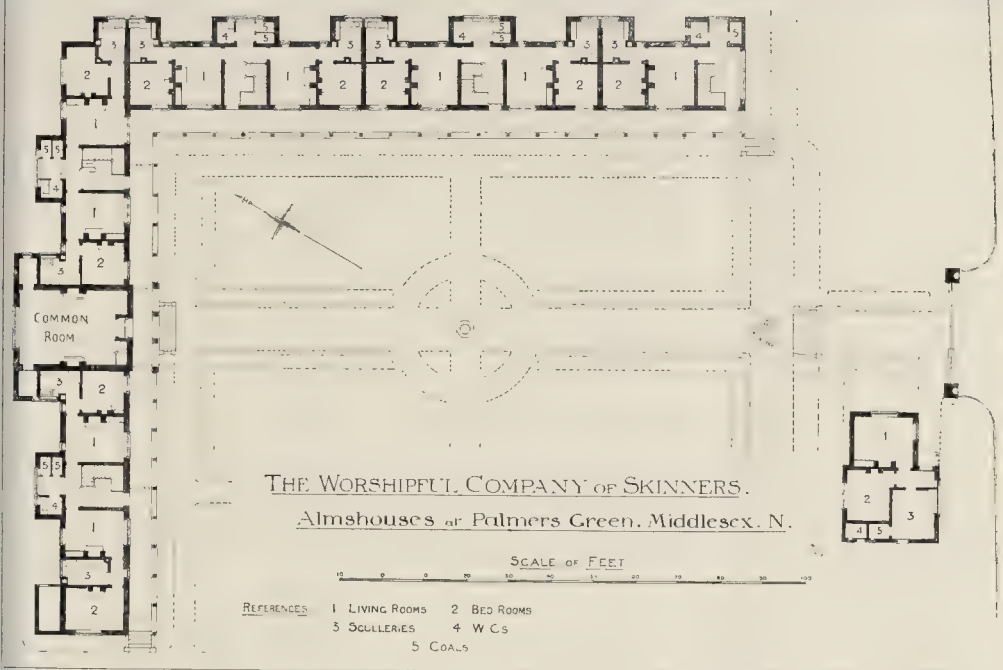


NEW ALMSHOUSES AT PALMER'S GREEN FOR THE



PHOTO L. THO. SPRAGUE & CO. 48, EAST HARDING STREET, LONDON. ONE 1/2"

MPANY—MR W CAMPBELL JONES, A.R.I.B.A., ARCHITECT.



question, said he was following the fissures in the rock at the Sheepstor dam to a depth at which no water came through, and they would then be filled up with cement.

On the motion of the President, seconded by Lieut.-Colonel Jones, V.C., a hearty vote of thanks was accorded to the Mayor and Corporation for the use of the room.

The members attending the meeting were subsequently entertained to luncheon in the Corn Exchange, Plymouth, by the Mayor (Mr. Laws), who presided. The Mayor proposed the toast of the Association of Municipal and County Engineers, and referred in eulogistic terms to the great improvements made in sanitary engineering during the last sixty years. The President acknowledged the toast. Mr. Barber (Islington) proposed the healths of Mr. Paton and Mr. Sandemann, and referred in high terms of praise to the splendid work done by those gentlemen in Plymouth. Both gentlemen responded to the toast.

The afternoon was devoted to visits to the Naval Works at Devonport Dockyard, the Hoe at Plymouth, and the New Sanatorium.

On returning on Friday evening, the members were entertained to tea at the Corn Exchange, by the Borough Engineer, the Water Engineer, the Consulting Engineer, and the Town Clerk; and also to the performance of "Faust" at the Theatre Royal in the evening.

The second day of the meeting was devoted to a visit to the important engineering works in connexion with the new Burrator reservoir.

Illustrations.

THE PUMP-ROOM BUILDINGS, BATH.

THE illustrations, one of which is at present exhibited at the Royal Academy, show the revised design which is now being carried out. The principal alteration from the original plan is that, with the exception of the museum, all the accommodation is now on the round-floor—the level of the present Pump Room. Also, the *schola* only of the old Roman bath will now be covered over, leaving the area of the water open to the sky, as shown in the new. Over the *schola* on the north side is a covered terrace opening from the new promenade. The contract for the work has been taken by Messrs. Jacob Long & Sons, of Bath.

J. M. BRYDON, Architect.

ORGAN CASE, ST. SAVIOUR'S CHURCH, SOUTHWARK.

The proper position for the organ in this church, after the rebuilding of the nave, was for a considerable time a matter of animated discussion.

Many suggestions were made, and models were even erected, but it was ultimately agreed that there was no place for it within the church which was not open to grave objections, either acoustic or architectural. No alternative remained but the erection of an organ chamber—in many ways an unsatisfactory expedient, but in this case inevitable.

The only place for it was the angle between the east wall of the south transept and the south choir-aisle on part of the site of the chapel of St. Mary Magdalen, which was pulled down in the early part of the present century. Two arches in the choir-aisle and one in the transept, formerly opening into this chapel, have been cleared out without interference with any ancient work, and it is in front of the latter that the case shown in the drawing will be erected.

The organist's console will be immediately behind the choir-stalls on the south side.

The organ is being built by Messrs. T. C. Lewis & Co., and, together with the organ-chamber, is the gift of Mrs. Courage, of Queen's Gate, as a memorial to her husband.

The drawing is exhibited in the Royal Academy.

ALMSHOUSES FOR THE SKINNERS' COMPANY, PALMER'S GREEN, N.

THESE almshouses have just been erected under the provisions of a scheme adopted by the Charity Commissioners in 1891, by which the Almshouse Charities, one at Great St. Helens, the other at the Mile End-road, were merged into one.

The Company hesitated for a long time before they finally agreed to abandon the picturesque cottages at Mile End, and it was only out of consideration for the health and well-being of the occupants that they did so, as the rooms were damp and ill-arranged, and without the most ordinary conveniences of everyday life.

The site which was ultimately acquired at Palmer's Green is a good one, with roads on two sides, and with some fine timber on it.

There are suites for eighteen occupants, each having a sitting-room, a bedroom, and scullery, with sink and copper, the water-closets and the coals being placed in the staircase hall on each floor. An endeavour has been made by simplicity

of outline and absence of obtrusive detail, to erect a building which should add to the feeling of rest and quiet which naturally belongs to such a place.

The gardens have been well-stocked with all the old-fashioned flowers, a sundial forms the centre-piece, and at the end of the main walk is a common-room panelled and furnished, where the inmates can study the daily paper and enjoy one another's society.

The materials used are red bricks and tiles, Ancaster stone for dressings, all external woodwork is oak, and the gable decorations are in cement.

The drawing is exhibited at the Royal Academy. W. CAMPBELL JONES.

THE KENT ARCHÆOLOGICAL SOCIETY AT DARENTH.

THE progress of the work of excavation at the great Roman villa at Darenth has been continuous since the subject was last referred to in these pages, and a greatly extended area of land has been fenced in and placed at the disposal of the workmen.

On Tuesday last, the 21st, a special meeting of the Kent Archæological Society was held on the site, for the purpose of inspecting the work that has already been done, and to investigate the remains. The day was fine, and the gathering was a large one. On arrival, the party, with Earl Stanhope, the President of the Society, assembled around Mr. George Payne, F.S.A., who has had the direction of the excavations from the commencement, and he gave an interesting account of the discovery and of the remains that have been unearthed, after which some planking, which had been placed for a protection against a large portion of walling covered with fresco decoration, was removed. The colouring was greatly faded owing to the length of time that the work has been buried, but sufficient remains to show that the pattern was one of well-defined curves and scroll-work in red, with lines in darker colours. Almost all the walls appear to have been painted, and traces of the plastering still remain here and there. One of the latest discoveries has been that of a tessellated pavement of ordinary squares of red brick similar to the others, but resting upon parallel walls of chalk laid in puddled clay, instead of upon the detached *gylla*, as elsewhere. Mr. Payne described the position of the various apartments, aided by a plan drawn to a large scale. It had been supposed that the southern limit of the huge building would have been met

with at a roadway which crosses the site from west to east, and which had been thought to be the modern successor of the original road of approach. This is found not to be the case, for the walls of two parallel sets of buildings are found to come quite up to it and to extend into the opposite field. Judging by the appearance of the walls on plan, it is most probable that they extend for a considerable distance into the field. The great extent of the buildings was well shown by the crowd of explorers spread over the site. The party consisted of at least two hundred and fifty persons, and was probably more, but it appeared small in comparison to the area, which is already much larger than that of any other known villa. The arrangement is beginning to assume the plan of a villa with large rooms, most of which were heated by separate hypocausts; with a series of agricultural buildings to the left of it, and a corresponding wing of stables, probably, to the right. One of the halls recently excavated has two parallel walls within, evidently to carry two rows of timber pillars, to divide it into a nave and aisles. Several bricks have been found, each being a quarter of a circle, used for the formation of circular columns.

After ample justice had been done to the remains, and Mr. Payne had been cordially thanked by acclamation for his laborious work, the party proceeded to Darenth Church, whose little shingled spire is visible amidst the foliage from every part of the site of the villa. Here Mr. Loftus Brock, F.S.A., gave a description of the building. After dwelling upon the east end, so well known as an example of Early Norman work, he pointed out to the party, which filled the building in every part, that this Early Norman work was an addition to still earlier work, and he claimed for the latter a Saxon date. This earlier portion, unlike the Norman part, is built entirely with Roman material from the villa. The angles of the nave are of Roman brick. In one place, a flue-tile which had been used in the villa, filled in with brick, as a support for a tessellated pavement, is used here as a portion of the walling without the filling in having been disturbed. In other places pieces of brick walling have been built up in blocks. The church has portions of every other style, and it forms a very interesting study.

THE ARCHITECTURAL ASSOCIATION.

THE Annual Soirée of the Architectural Association was held on the 16th inst., at the headquarters of the London Scottish R.V., James-street, Buckingham-gate, S.W., a large number of members and friends being present, including the President, Mr. E. W. Mountford, and the President-elect, Mr. W. D. Caroe.

On recent previous occasions the entire evening has been devoted to the performance of a burlesque; but this year, the managers, probably conscious of their inability to produce a long play which would embrace a sufficient number of professional or architectural topical allusions to justify its production, wisely varied the programme, and gave a "grand variety entertainment," as well as a one-act burlesque. The following professional lady and gentlemen assisted in the entertainment by permission of their respective managers, and their parts were very warmly received by the audience:—Miss Ray Maskell and Messrs. Frederick Upton, Arthur Helmore, G. C. Lovell Fry, Dudley Causton, Arthur Faber, F. Baring Ranalow, Arthur Nelstone, Harry Tate, Charles Birkett, R. B. Hopkins, Fred Frampton, and George Robey. After a reel by Captain E. M. Gore, Sergt. T. F. Earle, Sergt. T. Jackson, Piper Robertson and Pipe-Major A. L. Reith (members of the London Scottish R.V.) and a brief interval, the burlesque, entitled "King Arthur: an Examination of the Past," by Arthur W. Earle and E. Howley Sim, was performed. The characters were:—The King, Mr. J. Dixon Butler; Sir Lancelot, Mr. Albert Harris; Sir Mordred, Mr. H. Phillips Fletcher; Sir Percival, Mr. C. V. Cable; Merlin, Mr. R. Minton Taylor; "It," Mr. T. H. Lyon; and Guinevere, Mr. C. B. Carvill. Upon the "bill" it was stated that the scene was "Camelot, the seat of the District Surveyor, devised and executed by Mr. E. Graham Simpson; period: inquire at King William-street, Charing Cross. 'Time of day' indicated by the cartoon on front page." The cartoon, for which apologies were made to Olympia, Limited, represented the Architectural Association knight on horseback going forth to fight, scattering on his way the imp of Nihilism, the London Building Act, the Memorialists, Bogus Competitions, Ghosts, Exams., &c.

In the play itself, the King, who was repre-

sented as an architect, is told by Merlin that "to-day is the time fixed for thy annual exam.," and the incidents of the play relate to the examination and to the loves of Mordred and Lancelot for Guinevere, a new-woman bicyclist. The King, before departing to face the examiners, puts to his pupils some of "those deep sayings we must answer"; and in reply to the question, "What is the meaning of an entasis?" he is told that it is "a sort of swelling cultivated by the Greeks"; while the answer to "What is a raking shore?" is given as "an R.A. gardening." Guinevere, during the absence of the King, in manlike fashion tells Lancelot of her love for him, and flatters him by saying that his "broad brow denotes an intellect sufficient even to pass a Royal Institute of British Architects' examination, or at all events the Intermediate." The hasty preparation of competition drawings, at which the King, Guinevere, Sir Lancelot, Merlin, &c., all assist, was amusing, and the announcement of "fresh instructions" after the drawings had been commenced occasioned a hearty laugh, as did also the motto, "Design in haste, repent at leisure." The King, who feels that he has failed to pass the examination for one reason, because in the paper on professional practice, he wrote that it was no duty of an architect to study woods and forests—is later on informed by "It" that having failed to satisfy the Board of Examiners, and having failed to keep his professional knowledge up to the pitch of producing at a moment's notice all the information contained in Gwilt's Encyclopedia, together with all the clauses of the London Buildings Act, he is doomed to execution. "It," however, his "original love," declares that she will save him, for "no man may wield the executioner's sword unless he can say of his own knowledge what is the use of examination."

The dialogue was interspersed with some amusing songs, which were well received by the audience. The authors of the play were called and warmly received at its conclusion.

The proscenium and stage were erected by Messrs. D. C. Hancock & Co., of Stratford.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday, in the County Hall, Spring Gardens, Mr. Arthur Arnold, Chairman, presiding.

Unification of London.—Almost the entire sitting was taken up with a discussion on the Unification of London, the following motion and amendment, submitted by Mr. McKinnon Wood and Alderman Ritchie respectively, being considered:—

Motion.—"That the Council do represent to Her Majesty's Government the urgent importance of introducing in the present Session of Parliament a Bill, providing, on the general lines of the Report of the recent Royal Commission, both for the amalgamation of the City and County of London, and for the creation of local councils, beginning with those areas which are already suitable as regards size and population."

Amendment.—"That the institution in the place of the present Council of a single municipality embracing the whole of London would entail grave interference with the independence of Local Authorities and not conduce to efficient administration, and that in the opinion of the Council the interests of good government in London will be best served by strengthening Local Authorities and by transferring to them such of the powers now possessed by the Council as can be properly exercised by them, and at the same time by considering in conference with the Corporation of the City of London whether certain of the powers now possessed by them should be entrusted to the Council."

The amendment was rejected by 11 votes—68 voting against it, and 57 for.

Lieut.-Colonel Ford then moved that the following words be added—"and making due provision for the protection of the ratepayers outside the City from any inequitable burden in respect of the outstanding debts and liabilities of the City Corporation."

This amendment was also defeated, and the original motion was then agreed to.

Cheapening Land Transfers.—The Parliamentary Committee, reporting on the Land Transfer Bill, which had been referred to a Select Committee of the House of Commons, stated that the new system proposed by the Bill would tend to enormously reduce the conveyancing cost of transfer. The Council and the Board of Works had expended upwards of 1,000,000, in costs in connexion with the acquisition of property for street and other improvements, and the value estimated that at least one-fifth or one-sixth of

that amount had been paid for the conveyancing costs. They therefore recommended:—"That the Council do express its approval of the Land Transfer Bill, as regards London, and that the Parliamentary Committee be authorised to take all necessary steps in support of the Bill before the Select Committee to which it is referred."

Dr. White moved the following amendment:—"That the Land Transfer Bill having been referred to a select committee of the House of Commons for inquiry, it is inexpedient for the Council to express its approval of the Bill until that committee has reported; and that as the Bill is promoted by the Government of the day, the Council deems it unnecessary to take any steps or to incur any expense in supporting the Bill before the select committee."

The consideration of the matter was adjourned until next week.

Progress of the Blackwall Tunnel.—The Bridges Committee submitted a report on the progress of the Blackwall Tunnel works during March and April, in which they stated that in connexion with the cast-iron-lined tunnel, seven iron rings, equivalent to a length of 14 ft. 6 in., had been erected, and out of a total distance of 1,220 ft. beneath the river, from the centre of No. 3 shaft to the centre of No. 2 shaft, a length of 910 ft. 6 in. was completed at the end of April. The total approximate cost of the work done up to the end of April last was 510,305*l.*, of which the sum of 9,724*l.* represented the value of the work done on the raised approach roads, and 14,110*l.* the progress made during the last month.

New Street from Holborn to the Strand.—The Improvements Committee stated that the question of the formation of a new street from Holborn to the Strand had recently engaged their serious consideration. They were of opinion that the formation of such a thoroughfare was most necessary. After recapitulating the principal decisions at which the Council has previously come to on the subject, the committee stated that they had given further consideration to the matter, and were decidedly of opinion that they should proceed with the preparation of a scheme. But before they could do so, it seemed to them absolutely necessary in view of all that had gone before that they should have some clear indication of the Council's views, especially as since the question was last before the Council an understanding seems to have been arrived at in connexion with the betterment clauses of the Tower Bridge (Southern Approach) Bill, which they have no doubt would considerably affect the proposed new street from Holborn to the Strand. To facilitate an expression of opinion on the part of the Council, they recommended:—"That the Improvements Committee be instructed to prepare a scheme for the formation of a new street from Holborn to the Strand, subject to the condition that part of the cost of the improvement shall be dealt with on the basis of the compromise arrived at in connexion with the betterment clauses of the Tower Bridge (Southern Approach) Bill."

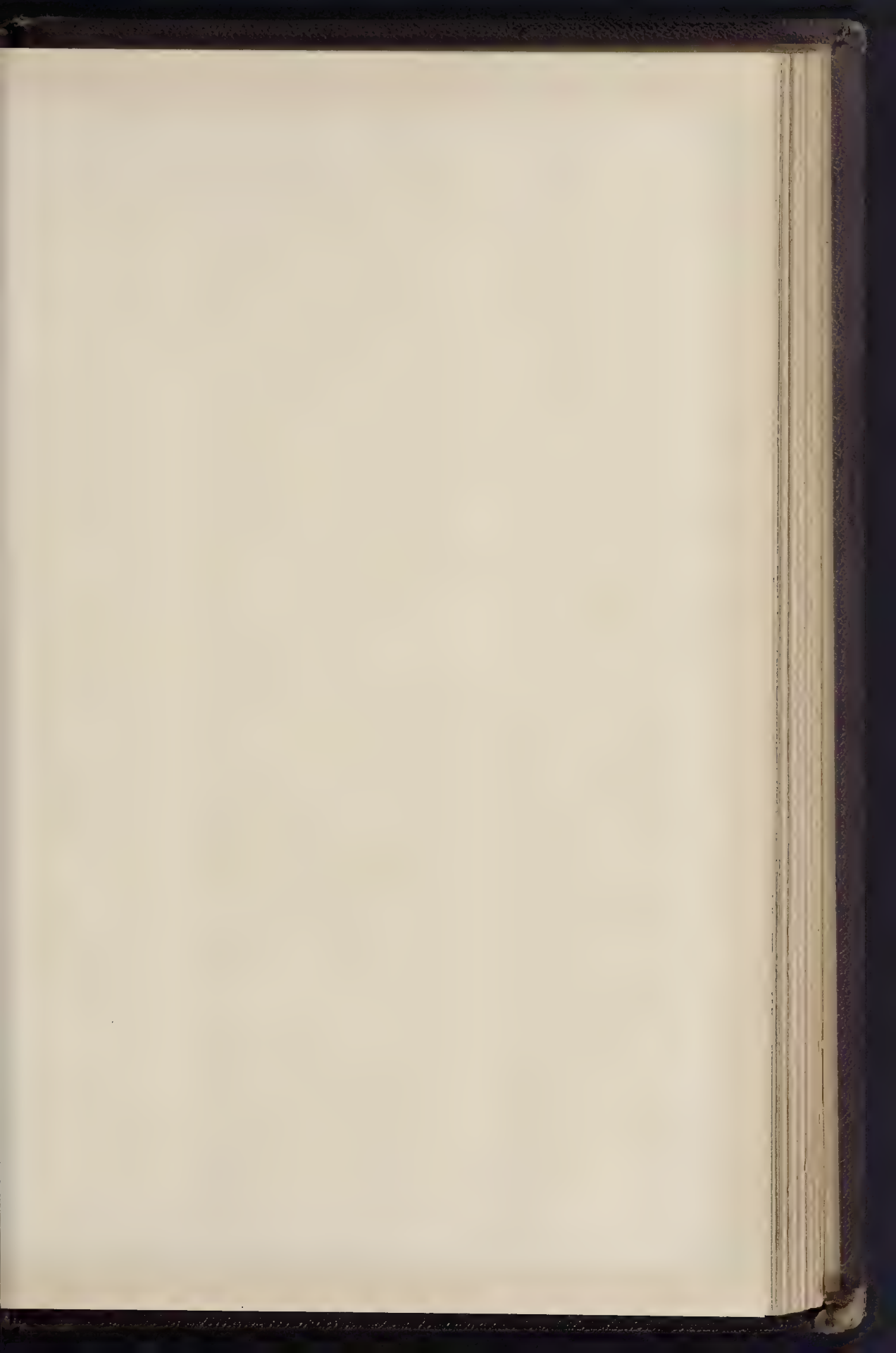
The report was opposed, and its consideration was adjourned.

After transacting other business, the Council was adjourned.

ARCHITECTURAL SOCIETIES.

LIVERPOOL ARCHITECTURAL SOCIETY.—Under the guidance of Professor Simpson, director of the School of Architecture and Applied Art, the student members of the Liverpool Architectural Society paid a visit on the 16th inst. to the Spring Exhibition at the Walker Art Gallery. The visitors devoted their attention to the architectural drawings. In the course of the review the professor pointed out the qualities of execution in different drawings and the best means of achieving similar effects. He also drew attention to instances in which sculpture was intimately associated with architecture, as in the design by Mr. John Belcher for the building of the Institute of Accountants, London, and the same architect's designs for the new South Kensington Museum. In reference to the drawings of interiors, he showed the effect and advantages of various styles of decoration, and especially of painting. The exhibition being especially rich in examples of Gothic and Elizabethan, these received considerable attention. A vote of thanks to Professor Simpson was cordially passed.

LINCOLNSHIRE ARCHITECTURAL ASSOCIATION.—The Architectural and Archaeological Association for the counties of Lincoln and Nottingham will meet this year at Stamford on Wednesday and Thursday, June 19 and 20. On the first day an excursion will be made to Donington, Tixover, Barrowden, Harrington





PUMP ROOM BUILDINGS, BATH. REVISED D



R. VIEW MR. J. M. DRYDEN, F.R.I.B.A., ARCHITECT

	LOCALITY, &c.	DESCRIPTION.	DIMENSIONS.		DRY WEIGHT.	ABSORPTION OF WATER PER CENT. OF DRY WEIGHT.					
			Inches.	lbs. ozs.		1 second.	1 minute.	30 minutes.	1 day.	1 week.	
1.	Buckley, near Chester	Wire-cut "Metalline"	8'9 by 4'2 by 2'5	8 o½	—	—	—	—	—	—	
2.	" "	Pressed "Metalline"	8'6 by 4'1 by 2'4	7 7	—	—	—	—	—	—	
3.	Heathfield, Newton Abbot	Vitrified Plain Facing	9'1 by 4'4 by 2'0	6 12	—	—	—	—	—	—	
4.	Ruabon, N. Wales	Blue "Facing"	8'8 by 4'3 by 2'6	8 13	—	—	—	—	—	—	
5.	Heathfield, Newton Abbot	Red "Facing"	8'8 by 4'3 by 2'0	8 13½	—	—	—	—	—	—	
6.	" "	Best "White glazed"	8'8 by 4'3 by 2'6	7 9½	—	—	—	—	—	—	
7.	Buckley, near Chester	Brook Hill Blue	9'1 by 4'3 by 2'5	7 9	1'72	5'17	6'03	6'90	8'18	—	
8.	" "	Flintshire white	9'0 by 4'3 by 2'5	7 11	2'15	6'40	8'22	10'14	11'40	—	
9.	Bracknell, Berks.	Red hand-made facing (No. 12)	8'9 by 4'1 by 2'5	6 4½	4'09	9'04	10'94	12'93	13'93	—	
10.	" "	Machine-made wire-cut red "Facing" (No. 13 x)	8'8 by 4'3 by 2'6	6 9½	4'7	1'89	9'47	13'74	13'74	—	
11.	Dunton Green, near Sevenoaks	Hand-made pressed red "Facing" (No. 4.)	8'8 by 4'3 by 2'5	5 15½	2'09	7'85	13'61	14'13	14'13	—	
12.	Bracknell, Berks.	White "Facing"	9'0 by 4'3 by 2'5	4 10	4'00	4'30	11'00	15'00	15'00	—	
13.	Dunton Green, near Sevenoaks	Red "rubber" (No. 9)	9'8 by 4'9 by 3'1	0 3	2'04	8'50	13'94	15'30	15'30	—	
14.	"Kieselguhr" earth	White "Gault"	9'0 by 4'3 by 2'5	6 4	1'60	6'50	18'00	20'00	20'00	—	
15.	Ruabon, N. Wales	White "Gault"	7'9 by 3'8 by 2'3	2 2	19'11	19'11	19'11	23'52	25'00	—	
16.	" "	Terra-cotta block	Irregular	moulding	12 2	51	51	1'80	5'97	5'97	—

This imbibed 20.5 per cent. during the week, and made a loud hissing sound (escaping air) when first brought in contact with the fluid. It may be taken as one of the most absorbent bricks used for building purposes, though its pleasing appearance would not lead one at first sight to think so. With reference to the Buckley bricks, a glance at the table shows that their absorptive properties are very variable; it is satisfactory to note that the designation of each variety is sufficiently clear to prevent mistakes. Seeing that they are all from one firm, the experiments clearly show that the manufacturers possess full control over the raw materials and burning; we cannot say much for the appearance of the bricks, but they are rough enough exteriorly for all practical purposes. The vitrified plain paving brick is well described by its name; it only absorbed 1.85 per cent., and is comparable in some respects with the smooth brick No. 4 from Ruabon, only that the latter is red and the former white. The other bricks fall into an intermediate position so far as total absorption is concerned.

The rate at which water percolated during the week presents many striking anomalies, as difficult to explain as the results on building-stone detailed in our columns a few weeks ago (*ante*, p. 294). The paving-brick from Heathfield absorbed no appreciable quantity for half-an-hour, but at the end of a day it took in 1.38 per cent. On the other hand, a less absorbent brick (in the end) imbibed .42 per cent. on being dipped in water for one second only, and the same material drank as much in one day as it did in a week. Comparing the results of a one-day immersion with those for the week, we find that the most absorbent bricks—from 10.34 to 20.5 per cent.—arrived, with one slight exception (No. 14), at total absorption in twenty-four hours, and, indeed, were almost fully saturated in thirty minutes. There does not seem to be much relationship between the results obtained in one minute as compared with those in thirty minutes. Thus one brick from Bracknell, which did not appear to be very absorbent during the first dip, or during the minute, utterly broke down in half-an-hour, and arrived at totality in one day. Another from the same district, presenting the same features at the commencement of the experiments, imbibed as much as 10.94 per cent. in thirty minutes. A remarkable case was presented by brick No. 8 from near Chester. With the exception of the abnormal material No. 15, it absorbed more on being dipped than any other in the list, but after shooting ahead during one minute's immersion it pulled up, and in the end came out with a lower figure than others which it had outstripped in the beginning. Finally, the experiments on ordinary bricks seem to indicate that, when the piece dealt with absorbs as much as 10 per cent. during twenty-four hours, there is no necessity to prolong the immersion; for bricks below that figure, and especially below 5 per cent., it appears to be desirable to continue for a week. Indeed, it would have been better to allow at least a fortnight for bricks like Nos. 1, 3, 4, 6, and 7, which were certainly absorbing at the end of the week. The only difficulty to contend with in such long immersions is the liability of chemical change. We had a striking proof of that even after the first two or three days, in dealing with the bricks mentioned in the table. Some of the red bricks from Bracknell being placed in the vicinity of the White Gault from Duntun Green discoloured the latter to such an extent as to quite disfigure it. It was not merely a surface coloration; it extended at least $\frac{1}{2}$ in. into the interior. The red colouring matter was iron, but there was not enough of it by weight dissolved to materially interfere with the experiments. This very clearly shows, however, the folly of erecting a building coursed with white and red bricks when both are very absorbent and the red has so little hold of the iron of which it is partly composed—unsightly iron stains are bound to appear.

The last line of the table refers to a moulded block of terra-cotta from Ruabon. Roughly speaking, this measured $8 \times 6 \times 4\frac{1}{2}$ in., with a ridge on one face about $\frac{1}{2}$ in. in height; it was hollow in the interior, and the walls varied in thickness in different parts of the block, from 1 in. to $\frac{1}{2}$ in. This absorbed 5.67 per cent. in one day, practically the same as the red "facing" brick from the same locality, which it seems to very closely resemble in other respects also.

Mr. Chas. Barry found that a block of terra-cotta which, when dry, weighed 20 lbs. 9 ozs., had increased in weight by 15½ ozs., after being immersed in water for thirteen days; to make

this result comparable with our table, this works out at 4.71 per cent. of the dry weight.

It is possible in regard to many kinds of terra-cotta that the exterior coating applied modifies the rate of absorption, but that does not hold good for the Ruabon sample we tested, the shell of which was solid and homogeneous. The results on every sample of brick, &c., tested in connexion with absorption, are recorded in the table.

GENERAL BUILDING NEWS.

NEW CHURCH IN ROSEMOUNT VIADUCT, ABERDEEN.—The Earl of Moray has just laid the memorial-stone of a new church, at present being erected on the west side of Rosemount Viaduct, and with front also to Stephenson-street, for the Bon Accord Free Church congregation. The church is to seat 750, and underneath there is ample hall and class-room accommodation. The cost will be 6,100l. Messrs. Ellis & Wilson, of Aberdeen, are the architects.

COTTON EXCHANGE, LIVERPOOL.—In order to provide a Cotton Exchange for Liverpool, it is proposed to reconstruct Brown's buildings for that purpose. Practically the whole of the central portion of Brown's buildings will be required for the Exchange, though there will still continue to be offices on either side, and also in the upper portion of the building. The Exchange will be 150 ft. long and 50 ft. wide. The room will be lighted principally by two large dome lights covering areas above, but there will be also windows at either end of the Exchange and Rumpf-street. The chief entrance will be by a grand staircase from Rumpf-street. Another entrance will be provided from Rumpf-street, and for the convenience of business people means have been taken whereby on each of the other sides access will be possible. A board-room and secretary's office will be provided, and in addition accommodation for telephones. Balconies are to be constructed at both the Exchange and Rumpf-street ends overlooking the room. The work of gutting the interior of the building has been one of constructional difficulty, but under the supervision of Mr. J. Francis Doyle, the architect for the Brown's-buildings Company, Limited, this has so far been accomplished. Mr. William Gunning is the clerk of the works.

NEW BOARD SCHOOLS, ABERDEEN.—The Aberdeen School Board has now accepted offers for the erection of a mixed school at Walker-road, Torry. There is accommodation for 1,300 pupils, and the buildings will include a science-room and a gymnasium. Key's mechanical system of ventilation has been resolved on, and the heating will be by steam. The School Board declines to publish the amount of the individual contracts, but the total is 10,121. 13s. 9d., which does not include furnishings. Messrs. Ellis & Wilson, Aberdeen, are the architects.

BOARD SCHOOLS, PEN MILL, YEovil.—The schools which have just been erected in Brickyard-lane for the Yeovil School Board by Mr. Pollard of Bridgewater, from plans by Mr. J. N. Johnston, are now completed. Accommodation is provided for 300 children in the mixed department, and for 250 infants, the infants and the mixed department being in two separate blocks.

CONGREGATIONAL CHURCH, ROTHBURY, NORTH-UMBERLAND.—On the 15th inst. the foundation-stone of a new Congregational Church at Rothbury was laid by Lord Armstrong, on a site in the main street of the village. The new church is being built upon the site of some old almshouses, which, before they were pulled down, were the only remaining relics of old Rothbury, bearing the date 1690. These will be replaced by new almshouses, to be built at the lower end of the village. The new church will provide accommodation for 300 people. It will be built of freestone, and the cost will be about 1,400l. It is to be in the Gothic style, and will be entered by a porch. There will be a vestry and lavatories at the back, and at the rear of the pulpit, an organ-loft. The architect is Mr. Stevenson of Berwick, and the contractors are as follows:—Masonry, Mr. Thomas Muckle; joinery, Mr. D. Bailey; slating and plaster work, Mr. John Gregory; plumbing, Mr. W. G. Mackay.

CHURCH, WILLESDEN GREEN.—The new church of St. Gabriel's, Willesden Green, is to be erected at the corner of Wain-lane and Chichele-road, Willesden Green, to supersede the present iron mission church. Mr. P. Day is the architect, and the new church will cost about 6,000l.

CARDIFF EXHIBITION.—A meeting of the building committee of the Cardiff Exhibition, 1896, was held on the 20th inst. The architect, Mr. Edwin Seward, produced plans of the building and submitted a report, which stated that the plan took the form of a double T, the upper portion of which is of double width and isolated from the other portion by a wide covered way, so that the sound of machinery, &c., may be cut away from the said other portion. This covered way can be further extended in length, if desired. The architect does not suggest any complete separation of the main buildings because of the disadvantage to visitors in wet weather of passing through the grounds from one building to another. The plans were approved.

subject to certain alterations in detail. The question of the introduction of a sanitation section was discussed, and it was resolved that a space be set apart for the purpose.

HOSPITAL, GLASGOW.—The memorial-stone of the Glasgow Samaritan Hospital for Women has just been laid by Lord Blythwood. The building when completed will consist of two distinct blocks—the hospital and the administrative block—connected by corridors. The hospital block will consist of two floors, each containing four wards, viz., one ward for six patients, one ward for four patients, two wards for two patients each, and a convalescent room. Accommodation will thus be provided for twenty-eight patients. A ward scullery will be placed to all the wards on both floors, and lavatory and bathroom accommodation will be provided in a building jutting out from the main block and cut off by a cross-ventilated lobby. The administrative block will consist of three floors. On the ground floor will be placed waiting-room, board-room, matron's rooms, and house surgeon's rooms. On the first floor sleeping and sitting-room accommodation will be provided for nurses. On the second floor bed-room accommodation will be provided for the servants, and on this floor will be placed the kitchen, scullery, and stores. On the ground-floor abutting the administrative block will be placed the operating theatre, with accommodation for twenty-four students, and a lecture-room adjoining seated for forty students. Above the lecture-room provision will be made for a reading-room, library-room, and museum. A hoist for patients will be placed between the entrance-door and operating theatre. The out-houses, consisting of mortuary, post-mortem rooms, wash-house, laundry, &c., will be placed to the extreme north of the site. The estimated cost of the buildings is 8,000l. The architects are Messrs. Macdonnell & Rogers, and the engineer is Mr. Macdonnell & Rogers. The contractors for the various works are: mason-work, Alex. Stuart; joinery-work, James Macallan; plumber-work, James Rae; slater-work, Burnett & White; plaster-work, Geo. Rome & Co.; painter-work, C. Carlton & Son; gasfitter-work, D. & G. Graham; tile-work, Kean & Wardrop; heating-work, James Cormack & Sons.

INFANTS' SCHOOL, BRIGHTON HILL, LEICESTER.—A new infants' school, which has been added to the school buildings of St. Luke's parish, Peeston Hill, was opened on the 18th inst. by the Bishop of Ripon. Mr. W. S. Braithwaite was the architect. By the extension extra accommodation has been provided for about 250 children. There are four class-rooms, a small hall, and a cloak-room. Advantages have been taken of the fall in the ground to build a large room, which will be fitted up as a gymnasium, and used by the young men attending the church. The cost has been 1,500l.

PUBLIC SCHOOL, GREENOCK.—The plans of Messrs. Boston, Menzies & Morton, Greenock, for the erection of Argowan Public School, have been selected by the School Board.

HOLIDAY HOME FOR CRIPPLED CHILDREN, SOUTHEND.—Princess Louise recently laid the foundation-stone of the Ragged School Union Holiday Home for Crippled Children, at Southchurch Beach. The new building is to cost about 3,000l. The architect is Mr. G. E. Holman.

NEW STALLS, MORPETH CHURCH.—New choir-stalls have been placed in this church, from the designs of Messrs. Boulds & Hardy, architects, of Morpeth. The work, which is in oak, has been executed by Messrs. Sopwith & Co.

WELLINGTON COURT MANSIONS, KNIGHTSBRIDGE.—We omitted to mention in our description of these buildings last week that the gas pipes and heaters were supplied by Messrs. W. G. Cannon & Sons, Southwark, and that the work in connexion with the speaking-tubes, electric-bells, hot-water supply and warming was done by them.

FOREIGN AND COLONIAL.

FRANCE.—The Corot Exhibition is open to-day (Saturday) at the Galliera Museum. It includes 120 works of the master. At the galleries of MM. Boussod and Valadon there is an exhibition of fifty pastels by M. E. Cagnotte, consisting of views of Paris.

The Minister of Public Works has decided on the opening of a competition on August 31, for the rebuilding of the Cour des Comptes. The programme will include the condition that the façades towards the Quay and towards the Rue de Lille are to be rebuilt as they existed before the fire in 1871. The ancient façades towards the Cour are also to be rebuilt, but in other respects the competitors will have liberty to treat the building as they please. There is talk of raising a monument to Chopin in the Parc Monceau. The Committee of the National and Colonial Exhibition at Rouen has given its award on the competition opened to landscape architects ("architectes-paysagistes") for the decoration of the gardens of the exhibition, which is to be opened next year. The first premium has been awarded to M. Darneval, the second to M. Beaucantin. M. Poussin, the architect, has completed the new "Maison de Repression," built from his plans at Montesson, and which is intended to replace the prison of Petite Roquette. The cost of the building, which was estimated at three million francs, has amounted actually to two millions and a-half. The municipality of Rouen intend to demolish the

chapel of the Lycée in that city, which is a curious monument of the Jesuit style of Renaissance built by the architect employed by Marie de Medici, after the plans of Bosio, in 1610.—The French Parliament has placed at the disposal of the Egyptian Government a sum of 500,000 francs for the erection of an "Ecole Française" at Cairo. The building is expected to be finished in the winter of 1897, and will be built near the proposed site of the Egyptian museum.—The fine funeral monument, by Bartholomew, in the Champs de Mars Salon, is to be purchased by the Municipality of Paris, and to be executed in stone for the decoration of the Cemetery of Père Lachaise.

GERMANY.—Of the numerous monuments to the late Emperor William, the one in course of erection at the junction of the Mosel with the Rhine promises to be very effective. The site is a triangular one, and the equestrian statue of the Emperor, which stands on a well-arranged pedestal, faces the apex. The statue is 13 metres high, and stands about 25 metres above the mean water-level. Herr Bruno Schmitz is the architect, and Herr E. Hündrieser is the sculptor. The design is the work of the architect.—Herr Hündrieser is also sculptor of the new statue, "Berolina," which is to be erected on the Alexanderplatz at Berlin. The casting of this statue has now been commenced.

MISCELLANEOUS.

LEEDS PAINTERS AND SCHOOL CLEANING.—The Leeds Building Trades Federation have adopted a resolution, says the *Leeds Mercury*, urging the School Board to adopt the suggestions offered by the employers and employees engaged in the painting trade of the city, believing that such a course will be beneficial to the health of the children attending the schools, and in the best interests of the ratepayers of the city. The suggestions are as follows:—(1) That the colour of the distemper on the walls be changed each time, so as to ensure the walls being properly washed; (2) that all work to be re-painted should be washed by painters; (3) that one member of the Master Painters' Association and one of the operatives be allowed to visit the schools during the cleaning, to examine the work being done; (4) that where there exists a doubt as to an employer paying the standard rate, his wage-books shall be examined; (5) that a number of the schools be done during the winter holidays.

PUBLIC IMPROVEMENTS AT NEW BRIGHTON, CHESHIRE.—A number of Manchester capitalists have formed a company with a capital of 20,000*l.* for purchasing the Gorsey Hill and Stoney Hey estates, comprising the loftiest eminence in the Wallasey district at New Brighton, which commands a magnificent view of the Mersey, and approaches to the Mersey and Dee, and the Snowdon and Carnarvonshire ranges. It is intended to erect a tower on the summit of the hill. The grounds will be laid out on the lines of Belle Vue at Manchester and the Douglas pavilions and pleasure-grounds, and provision will be made for the erection of a playground, by racing and cycling track. The company has secured the services of Mr. Huon A. Matear, F.R.I.B.A., of Birkdale, to develop the undertaking.—*Liverpool Daily Post*.

"VARIABLE POWER" LIFTS.—The wording of the notice of the lifts at Wellington Court, in our last issue, rather gave the impression that the variable power in connexion with these lifts was a new feature introduced by the firm who supplied the lifts referred to. This would not be correct, as one other well-known firm, at least, has been making variable power lifts for some time back.

ARBITRATION AT CAMBRIDGE.—"BETTERMENT."—Mr. Arthur Harston, F.S.I. (Messrs. A. & C. Harston, surveyors, Leadenhall-street, City), the arbitrator appointed by the Local Government Board, has published his award in the case of Foster v. The Cambridge Corporation. The Arbitrator fixes at 2*sd.* the compensation due to Mr. Foster in respect of the demolition of a building in Bank's-court, Little St. Mary's-lane, Cambridge, and the acquisition, without compensation, by the Corporation, and he further awards that the owners of the adjoining houses, Nos. 18 and 19, Little St. Mary's-lane, shall pay to the Corporation in equal moieties the sum of 2*sd.* for the "betterment" of their property consequent on the pulling down of Mr. Foster's "obstructive" building. This case, of great interest, being the first arbitration under section 38, Part II., of the Housing of the Working Classes Act, 1890, under which the claimant's building was adjudged to be an "obstructive" building, which, in the words of the Act, is interpreted to be one which "stops ventilation, or otherwise makes or conduces to make other buildings (in proximity or in connection therewith) to be in a condition unfit for human habitation, dangerous or injurious to health; or prevents proper measures from being carried into effect for remedying any nuisance injurious to health or other evils complained of in respect of such other buildings." The adjacent buildings which were so obstructed are two old tenements in Little St. Mary's Lane, which let at 3*sd.* per week, landlords paying rates; the owners of these have now, under the

provisions of the Act above-mentioned, to pay for the compulsory betterment of their property by the removal of the obstructive building.—*Land Agents' Record*.

THE CITY COMMISSION OF SEWERS.—A meeting of the Commission of Sewers was held at the Guildhall on the 21st inst., when the question of the personnel of the Engineer's staff was finally settled after being many times debated, and being made the subject of numerous special reports during the past two years. After another long discussion, the report of the special committee appointed in November to consider the question was adopted on a division, Mr. H. E. Stacey, with twenty-one years' service, being appointed Chief Assistant, and Mr. J. G. Garthwaite, with eight and a-half years' service, Principal Draughtsman, each with salary increased 3*sd.* a year. A letter received from the Board of Trade, enclosing proposed regulations and conditions for securing the safety of the public, and for ensuring a proper and sufficient supply of electrical energy, was referred to the Streets Committee. The court was adjourned to Tuesday, June 11.

THE PROPOSED ALTERATION OF BUILDING REGULATIONS, PAISLEY.—Various builders have already shown their desire to take advantage of the proposed alterations of the building regulations at Paisley. At a meeting of the Burgh Police Commissioners on the 13th inst., it was decided by a majority that application should be made to the Sheriff for power under Article 12 of the Building Rules annexed to the Burgh Police (Scotland) Act, 1892, so that builders might be enabled to erect tenements with their mean and mutual gables a few inches less in thickness than the statute meantime admits of. At the Dean of Guild Court on the 15th inst. several plans were lodged in accordance with the proposed alterations; but as the Sheriff has not yet given his sanction to the change, the plans were continued.—*Glasgow Herald*.

SANITARY INSPECTORSHIP, AIRDRIE.—On the 16th inst. a special meeting of Airdrie Town Council was held to appoint a Sanitary Inspector, Burgh Surveyor, and Master of Works. The Council proceeded to vote upon a short list of five applicants, with the result that Mr. Charles Brown, County Inspector, Airdrie district of Lanarkshire, was appointed.

INSTITUTION OF CIVIL ENGINEERS.—At the last ordinary meeting of the Session of this Institution, on the 21st inst., Mr. W. H. Preece, C.B., F.R.S. (Vice-President), in the chair, it was announced that the several Associate Members had been transferred to the class of Members, viz.:—William Henry Cole, Walter Edmund Cook, William Julius Mirtles, B.Sc., James Smith Molison, Oliver Claude Robson, Edward Brownfield Wain, and Alfred Edward White. At the same meeting it was reported that twenty-seven candidates had been admitted as Students, viz.:—Alfred J. Alcock, T. J. Aggart, Aston, Charles Orr Campbell, Gaspard Robert de Mussenden Carey, Jesse Edward Chapman, Louis Whitfoot Clarke, William Harold Arthur Court, Alexander Gratitude Craig, B.Sc., Alfred Arthur Davis, Clement Frederick Davis, B.A., George Crosbie Dawson, Robert Manning Dowson, Haines Breebanck Ede, Art. Ver. Grimsland, John Inglis, B.Sc., James Gray Mathieson, Allan Macrae Brown, Harry Scott Morrison, John Leslie Mowbray, James Just Niven, Henry John Rofe, B.A., Leslie Rosevear, Charles William Scott, Benjamin Thomas Stubbs, John Taylor, Edward Lloyd Williams, and Hamilton Arnison Woods. The last ballot of the session resulted in the election of two honorary members, viz.:—Oscar Charnock, Chicago, and Henri Schneider, Le Creusot; of four members, viz.:—Harry Victor Sampson Baker, P.W.D., India; Rawlinson Tennant Bayliss, Old Broad-street; George Humphres, P.W.D., India; and Emanuel Alois Ziffer, Vienna; and of thirty-eight Associate Members, viz.:—Frank Joseph Agabeg, Sitarampore; William Banks, Rochester; Henry Kynaston Blake, Guildhall; Henry Lane Brown, Rhyll; Matthew Taylor Brown, B.Sc., Glasgow; Gerard Macleay Browne, Coolgardie; Robert Arthur Bruce, Bolton; Edmund Burrows, P.W.D., Cape Town; Frederic Edward Theodore Cobb, Geelong; Reginald Haratt Crompton, Stud. Inst. C.E., Transandine Railway; Henry Mangles Benjamin, and N. W. Railway; Arthur Montefiore Wise, Eastern Johannesburg Railway; Herbert Francis Edwards, Cardiff; Harry Glen Finlaison, P.W.D., Egypt; James Fergie, Westminster; James Fraser, Railway Department, Sydney; William Willis Gale, East Grinstead; Bernard Godfrey, Stud. Inst. C.E., Droivich; Louis Greene, Stud. Inst. C.E., Brighton; Joseph Hawley, Portsmouth; Joseph Hope, P.W.D., Sydney; William Ingham, Plymouth; Edmund William Janson, M.A., Leadenhall Buildings; Charles William Jenkins, P.W.D., New South Wales; William Arthur Baird Laing, Edinburgh; William Robert Manning, Chelsea; Bianor Silvano de Mendonça, Rio de Janeiro; William James Milner, P.W.D. Sydney; Joseph Kuschner, Westminster; Joel Settle Madley, Staffs.; Joseph Shepherd, Leeds; Sophie Simmelkjer, Lotherbury; Charles Edward Simpson, Beekton; Thomas William Loraine Spencer, P.W.D., New South Wales; Sidney Stallard, Stud. Inst. C.E., Maidstone; William George Walker, Westminster; Bertram Braund Walby, Eltham; and George Bliss Winter, Madras Railway.

WIRING FOR ELECTRIC LIGHT.—We have received a description by Mr. F. Bathurst, the agent for the Interior Conduit and Insulation Company, of New York, of this system of house-wiring. To many householders the great drawback to their adoption of the electric light is the wiring of their houses. If the house was wired for the electric light when it was being built, then as a rule the wood casings are put flush with the walls, and if the covers are neatly pushed and carefully put on, they need not be unsightly, as they can be painted or stained the same colour as the walls. If, however, the house has to be wired after it has been built, then the wood casing is put on the surface of the walls and ceiling, often without much regard to the appearance of the room. In this case systems like the "concentric system" and the "interior conduit system" give excellent results. The great advantage of the latter system is the ease with which the tubes can be laid throughout a building in the course of erection, similarly to the way in which gas-pipes and water-pipes are laid. Then, if at any subsequent time the electric light is wanted, the house can be wired easily and without any structural alterations. Mr. Bathurst explains the method of distribution on this system, of how the conduits are taken through floors and round corners, and the ease with which joints can be made. All the details of the system have been thoroughly thought out, and any intelligent gas-fitter or plumber would be able to join the conduits and follow the design of the wiring without difficulty. As we have recently referred to the advantages of this system we need not recapitulate them here.

EDINBURGH WATER SCHEME.—Mr. Wilson, Engineer to the Edinburgh and District Water Trust, was, on the 16th inst., appointed Engineer of the new water scheme of the Corporation.

CAPITAL AND LABOUR.

THE LONDON BUILDING TRADE.—The dispute in the London building trade is once more assuming a serious aspect, consequent upon the determination of the men belonging to the various unions not to accept the appointment of an arbitrator to settle the question of the proposed new rules, and at the same time to insist upon the continued observance of the 1892 agreement. Letters officially announcing that decision have already been received by the Central Association of Master Builders from a number of societies. It is stated that if no *modus vivendi* can be arrived at before June a strike or lock-out is imminent, and that the executive of the Building Trades Federation are preparing for such an event.

STATE OF EMPLOYMENT IN APRIL.—Employment in most of the industries, says the *Labour Gazette*, for which returns have been received, shows an improvement in April as compared with March. Owing, however, mainly to a falling off in mining, the percentage of unemployed in all the unions making returns remains unchanged. An improvement has taken place in the chief branches of the building trades. The percentage of unemployed in unions making returns has fallen from 4.9 to 2.7, compared with 2.8 in April, 1894. Twenty-eight fresh disputes have occurred in the Building Trades, twenty-three of which were chiefly due to wages questions, four to questions of working arrangements, and one to a question of unionism.

CARPENTERS AND JOINERS' DEPUTATION.—In the House of Commons on the 17th inst. Mr. Broadhurst asked the Secretary of State for War whether he was in a position to reply to the questions relating to wages, piecework, and other matters, addressed to him by a deputation of carpenters and joiners on February 18. Mr. Woodall: The points brought before the Secretary of State's notice by the deputation referred to involve questions of a very complicated nature, which require, and are receiving, careful consideration. It is hoped that a decision may be announced in the course of a few weeks.

MEETINGS.

FRIDAY, MAY 24.

Architectural Association.—Mr. Walter Crane on "The Influence of Architectural Style upon Design." 7.30 p.m. Glasgow Architectural Association.—Visit to Douglas.

SATURDAY, MAY 25.

St. Paul's Ecclesiastical Society.—Visit to Bromley, &c. Trains leave St. Paul's Station at 2.40; Victoria, 2.45; and Cannon-street, 2.53. London and Provincial Builders' Foremen's Association.—Monthly meeting, Memorial Hall, Farringdon-road, E.C. 7.30 p.m. Northern Architectural Association.—Visit to Jarrow, &c. Edinburgh Architectural Association.—Visit to (1) Floors Castle; (2) Kelso Abbey.

MONDAY, MAY 27.

Surveyors' Institution.—Annual General Meeting (1) to receive the report of the Council, and the announcement of the result of the election of officers for the ensuing year. (2) Presentation of prizes awarded to successful candidates, in connexion with the recent preliminary and professional examinations. 3 p.m.—Annual Dinner, Holborn Restaurant 6.30 p.m. Society of Arts (Lecture).—Mr. Ernest Hart on "Japanese Art Industries." 11. 8 p.m.

TUESDAY, MAY 28.

Society of Arts (Applied Art Section).—Prof. W. B. Richmond, A.R.A., on "The Decoration of St. Paul's." 8 p.m.

13,181, G. Brindley and others, Siphon-Cisterns and Water Waste Preventers.—5,813, H. Bladen and others, Girders.—7,276, A. Boulton, Upholstery Work.—3,401, M. Lander, Grates and Stoves.

LONDON.—For new shop fronts to Nos. 147 and 149, King-

street, Hammersmith, for Mr. E. Evans. Mr. J. Hume, architect and surveyor, Chiswick :

"Kiev".....	£147	o	C. Rogers	£150	o
Leah & Smith	119	10			
<i>Mr. S. G. Cresson paid.</i>					
Laughan	£540	o	T. Bendson	£190	o
Rogers (accepted)	193	10			
<i>LONDON.—For alterations and decorations to the "Crown and Scapere" public-house, Meana-road, Hammersmith, for Mr. John Jackson. Mr. J. Hume, architect and surveyor, Chiswick—</i>					
"Daker"	£377	o	C. Rogers	£285	o
Fisher	262	0	Pope & Co.	255	0
Speasheley & Sons	355	0	C. W. Knight (accepted)	274	10
<i>LONDON.—For repainting, cleaning, painting, &c., of the buildings of the Cleveland Street Sick Asylum for the Managers of the Central London Sick Asylum District. Mr. S. Cross, architect—</i>					
			<i>Specification.</i>	<i>No. s.</i>	
Harber & Bellamy	£456	0		£314	4
J. Smith	202	6		208	10
Mills	269	0		232	0
Vinehill	1,673	0		1,673	0
& H. B. Barn	1,845	15		1,845	15
W. Knight	1,745	10		1,745	10
Barchieschi	1,745	10		1,745	10
Nesl	1,573	17		1,573	17
St. George	1,745	10		1,745	10
Marchant & Hunt	1,747	11		1,747	11
Knight & Son	1,481	40		1,481	40
Durrell & Co.	1,315	5		1,315	5
<i>LONDON.—For painting exterior, &c., of Prince's-road Boarding-school for the School board for London. Mr. T. Baile, architect—</i>					
Henry & Son	£ ..	o	Chiffon	£186	0
James & Co.	186	0	A. C. Hind	186	0
Callow	186	1	E. A. Hargrave	186	0
Errol & Dames	184	0	Graham & Graham	180	0
Neal	18	0	Chappell	183	0
<i>LONDON.—For alterations and decorations at No. 4, St. Alban-street, N.W., for Messrs. E. A. Hargrave & Co., 83, Abchurch-lane, Strand, architects, roob, Queen Victoria street, E.C. 4.—</i>					
Kerry	£350	0		£350	0
John Appleby, Curwail-road, (accepted)	18	0		18	0
<i>LONDON.—For a covered stand, dressing rooms, &c., at</i>					

Embankment, W.C. :—

J. H. & A. Bywaters & Sons	£1,456 0	Thomas Bendon	£1,096 1.
Thomas Boyce	1,421 0	William Johnson & Co., Ltd.	1,075 0
Villain, Longmire		John Mowlem & Co.	1,018 ..

Co.	1,337 c	Perry & Co.	1,000 c
Dall, Beddall, & Co.	1,100 o	Alfred Bush & Sons ..	997 c
John Allen & Sons ..	1,056 v	Thomas Gregory &	
Jiggs & Hill ..	1,114 d	Co.	937 o
Robert Yerbury & Sons	1,165 o	Holloway Bros.*	930
Latman & Fothering-		* Accepted.	
ham	1,112 o		

LONDON.—For the erection of mortuaries, &c., St. Marychurch-
street, for the Rotherhithe Vestry. Mr. Norman Scorgie, surveyor,
over-road, Rotherhithe. Quantities by surveyor:—

Wm. Knight & Sons	1,145	8	10	Wm. Pavey	1,173	0	0
E. Williams &	1,219	0	0	T. White & Son,	1,073	9	0
Sons	1,145	0	0	Habam Bros.	1,073	9	0
W. Knight & Sons	1,277	0	0	T. White & Son,	1,073	9	0
Builders	1,137	0	0	Fairfield	1,073	9	0
Chas. Chafin	1,137	0	0	Bow (accepted) ..	998	0	0

LONDON.—For the extension of "Kettner's" Restaurant.

Church-street, Solihull, W., to Greek-street, for Mr. G. Sanghiorth	
Contract No. 2.	Messrs. Jno. Waldram & Son, surveyors, 17,
Lingham-lane-street, Charing Cross, W.C.	Quantities supplied :—
Carker & Co.....	£2,343
Nicholson	£1,085
Holloway	£1,995
Wandsworth Common*	1,955
<div style="text-align: center;">* Accepted.</div>	
[Surveyors's estimate, £1,974.]	

North-street, S.E., at the Trustees of the late Moss Isaacs, Messrs.		
Waldram & Son, surveyors, 17, Buckingham-street, Charing		
cross, W.C. Quantities supplied —		
Capman	£835	Johnson, Ltd. £705
Over & Son	735	C. P. Roberts
Clark & Son	7-0	
[Surveyor's estimate, £695.]		

CLAPHAM — For drainage and sanitary work at the "Rectory, Clapham, for the Rev. C. P. Greene, rector. Under the superintendence of Mr. Frederick Colyer, M.Inst.C.E., 18, Great George-street, Westminster, S.W. —

Jennings £395 | F. W. Burrell, Clapham * .. £382

* Accepted.

LONDON For the erection of .. brick and corrugated-iron shed,
the L indoor-road depot, for the Vestry of the Parish of Lambeth,
by James P. Norrington, Surveyor to the Vestry —

Jackall	Galvanised	Batley, Sons, & Holness	£537 0
Iron Co.	£757 15	A. & J. Mann	536 "
Wm. Lysaght, Ltd.	145 6	David O'Leary	530 0

Wm B. Holloom & Co., ..	564	0	George Britain, 247, Ken-	
J. Coleman & Co., ..	572	0	ington road, S.E.* ..	436 0
Blinday & Greenwood	583	0	Charles Leather	412 0
Instructional Ironworks			* Accepted.	
Co.....	545	0		

LONDON.—For constructing new offices for the teachers of the
 ma School, Bermondsey, for rehousing the offices of all depart-
 ments with stoneware troughs and automatic flushing tanks, and for
 providing a new system of drainage:—for the School Board for
 London. Mr. T. J. Bailey, Architect.—

E. Nightingale	1,645	J. Marsland	1,085
Downs	1,210	Leeks & Hooker, Weber- row *	995
the Bros.	7,179		
Inan & Co.	1,125		

* Recommended for acceptance by the Works Committee.

LONDON.—For refitting the offices of all departments of the God's-road School, Peckham, with stoneware troughs and automatic flushing-tanks, for providing additional offices for the infants department, and a new system of drainage, for the School Board for London. Mr. T. J. Bailey, Architect :
 R. H. F. Higgs £1,694 W. Downs £1,427

Madison	1,054	Cassell & Co.	1,350
e & Son	1,054	G. Parker, Peckham*	1,300
hey Bros.	1,014		

* Recommended for acceptance by the Works Committee

LONDON.—For the provision of a manual training centre in con-

on with the Deptford Lower-road School, for the School Board	
London. Mr. T. J. Bailey, Architect:—	
at & Sons.....	£1,850
Mr. C. Bowyer.....	£1,448
Mr. Nightingale.....	1,540
Mid-Kent Building and	
Down's.....	1,495
Contracting Works, Ltd.	1,405
Stevens & Co.....	1,459
J. Marsland, Watworth*..	1,370

* Recommended for acceptance by the Works Committee.

ESTIMATES GIVEN ON INTERVIEW:

The Builder.

VOL. LXVIII. No. 2725.

JUNE 1, 1895.

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The Abbeys of Great Britain.—XIII, Lindisfarne—Drawing by Mr. E. Ridsdale Tate.....	Double-Page Ink-Photo.
Plan of Lindisfarne Priory	Double-Page Photo-Litho.
New Chapel, Cheltenham College.—Messrs. Prothero & Phillott, Architects	Double-Page Photo-Litho.
Organ, St. Alban's Church, Teddington.—Mr. A. H. Skipworth, Architect	Double-Page Ink-Photo.

Blocks in Text.

Sketches Illustrating Paper read by Mr. Walter Crane before the Architectural Association.....	Pages 427, 429, 431
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Fellowship of the Institute.



HE question of how, why, and wherefore architects should be elected Fellows of the Royal Institute of British Architects seems destined to be the subject of endless discussion.

As our readers will see from a report in another column, the matter has entered on a new phase through a combination of a number of members of the Associate Class in the Institute, who have put certain questions by letter to the members nominated for the new Council, and have held a semi-formal meeting to consider the answers to these questions, and to form a committee to carry out the views of those who were responsible for the calling of the meeting.

We presume that the questions put to the candidates for election to the Council may be taken as expressing, by implication, the views of those who propounded them; and the inference is that the body of Associates in question wish the election of Fellows to be restricted to Associates, other architects who were in practice before 1880, and those whose work is of exceptional merit. Why the year 1880 is selected as a line of demarcation we do not quite understand. Reference was made by two or three correspondents to the desirability of a term of twelve years in practice for those who are not Associates, but the selection of the year 1880 goes a good deal beyond this limit, and we should say unnecessarily. If the fact of having been a certain number of years in practice is to be an element in the case, where a candidate is not elected from the class of Associates who have passed a qualifying examination, the term of seven years provided in the Charter as existing seems sufficient, and it is desirable to maintain it for the simple reason that it is in the Charter; that the governing body of the Institute is bound to act according to the Charter, which has already been revised once, and further revision would be very inconvenient. If we take question 3 of the Associates' circular (see the report) along with question 2, there is really no reason why we should expect that architects who have been in practice since 1880 should have been more likely to produce "work of exceptional merit" than

those who have been only seven years, or, for the matter of that, only one year in practice on their own account. The requirement that a candidate should have been in practice for a certain number of years is of value, not as ensuring that his work should be of any special merit, but as showing that he has attained a certain stable place and position, and is not a mere phenomenon of a moment who has done one brilliant thing and subsided; it shows, moreover, that he has had qualities which have commanded the confidence of the public, and have gained him continuity of work: all which, though prosaic, perhaps, is very much to the purpose.

The main object of the questions circulated is, of course, to promote the principle that Fellowship of the Institute should depend, mainly, on the possession of high artistic faculties on the part of a candidate; that architecture is an art and not a business. With this view we have, of course, a great deal of sympathy; it is the right view in the main, but there are certain limitations in regard to it, which ought not to be overlooked. In the first place, considering the subject generally, an architect, for all that he is an artist, must be a man of probity and a man of business habits and perceptions also. It is idle to overlook this. He is not on the same footing as a painter, for instance. A man who commissions a picture from a painter is hardly concerned with anything except the painter's genius and capacity to produce a work that will satisfy him. He may complain if the production of the painting is unconscionably delayed, especially if he has paid anything in advance for it; but that is almost the only moral or "business" element that can come into the matter, beyond the signature of the cheque and the receipt for it. But an architect, however much of an artist he may be, is concerned in the production of a work, the main end of which, in forty-nine cases out of fifty, is a practical one; and, moreover, he is the agent of his client in the administration of a considerable sum of money to the best advantage, and in overseeing the work of a number of persons, settling conflicting claims, and deciding on the validity of various charges, &c. Unless every building-owner is to engage an extra person as surveyor and business manager, the architect must take such duties upon him, and therefore it is absurd to say, as Mr. Hadfield does in his

letter, that architecture is not a profession, but a constructive art. It is both, and in modern life it must inevitably be both. It is really suicidal to say otherwise.

The other limitation is in regard to the proper objects and powers of the Institute. The desire of the members of the meeting referred to, and of some of their correspondents, is to raise the artistic status of Fellowship, and therefore the artistic status of the Institute; a very laudable desire in itself, and one which some of the gentlemen who composed the Associates' meeting have every right to urge, though we can hardly say this of all of those who were present on the occasion referred to. But the question is whether the Institute of Architects was ever constituted with the object of giving an artistic imprimatur by electing a man a Fellow of its body; or rather there is no question at all in the matter. It never was constituted for that object. The requirements of its critics are that it should be transformed into a body like the Royal Academy, to which an artist is elected on account of the excellence of his works. But the Royal Academy already exercises that function in regard to architects; and an architect who has shown exceptional artistic power and culture is thereby eligible for election to its ranks. To put the Institute on the same footing would be making another and more limited Academy, which is not wanted, and would be changing its whole scope and object as originally founded. On this subject we commend to the Associates' meeting the words of the letter received in answer to their questions from Mr. Phené Spiers, as given in our report of the meeting. He points out the distinction between the Academy and such a body as the Institute, as we have just defined it, and adds that "integrity in professional practice is of even more importance in a candidate for the Fellowship than exceptional merit in design." That, we presume, will be considered by some people a very low view to take of the matter. It is plain common sense for all that, and it would not be difficult to name instances (one at least occurs to us—not among living architects) of men who, with exceptional artistic talent and capabilities, have failed totally in making a high position as architects, for the reason that no one could confide in them. Mr. Spiers goes on to say that men who had carried out satisfactorily, in a practical sense,

large and important buildings, in which practical considerations were of the first importance, had every claim on that ground to election as Fellows of the Institute, even though in an artistic sense their works were "damnable." That, again, is common sense, however unpalatable it may appear to some people; and it comes with the more force from one who is especially known for his artistic power in drawing and for his studies and knowledge in regard to ancient architecture, which is one of the ideal sides of the subject. If Mr. Spiers were a mere surveyor, there might be excuse for regarding his logic with suspicion, as a foregone conclusion; but he is nothing of the kind; and we hope, therefore, that some consideration may be given to his words.


The fact is that, in regard to certain classes of buildings, practical knowledge is of as much value to the public as artistic genius is in regard to other classes of buildings, and the Institute is bound to recognise both. But also, we may add, it is most especially bound to recognise practical ability, because that is a side of professional acquirement on which a positive and definite judgment can be formed. The recent policy of the Institute examinations has been directed mainly towards ensuring a certain standard of technical knowledge among those who are to become members of its body, and rightly, because that standard it can ensure; the possession of artistic genius it cannot ensure. And it seems rather illogical that those who are loudest in objecting to Institute examinations because architecture is an art, "and you cannot examine in art," are also loudest in demanding that the Institute should make artistic merit the test of election.

Who is to decide on such a test? The fourth query put to intending candidates for seats on the Council was, whether they would be in favour of photographs of the executed work of candidates for Fellowship being exhibited at the Institute for one month before their election. Several correspondents who were generally in favour of the position taken up by the Associates' meeting expressed themselves, we observe, in decided disapproval of that suggestion. It appears to us most objectionable that candidates should be asked to submit photographs of their works to the general body of the Institute in order that the general body, including many who may be both their juniors in years and their inferiors in knowledge and ability, should sit in judgment on them and decide whether they are fit to be elected. We might at least require that the general body of the artistic persuasion should first show some symptom of knowing their own minds and being agreed as to what they admire. We have not heard much of such unanimity. What we have found in many cases is that the younger generation of the "art" set think everybody's work bad, except their own and (if they are unusually large-minded) that of one or two of their friends. We observe at the same time that such persons are usually exceedingly irritated at any criticism or depreciation of their own productions. There are exceptions no doubt, but that is a largely-prevailing temper of mind among the younger architects of the day, and it can hardly be called a judicial, or even a judicious one.

That there should be dissatisfaction with the Institute we are not surprised; but reasonable grounds for dissatisfaction are not to be found so much in connexion with its recent schemes as in its want of enthusiasm, and in the prominence given to subjects of mere business and to persons whose only claims to attention have no connexion whatever with architectural art. But this is a matter much more of detail than of principle. The principle of testing the technical efficiency and knowledge of its would-be members by an examination is a sound and useful one; it has we believe done much good already; and it is hardly correct to say that the Institute is taking a

new line in attaching importance to the technical and professional side of architecture. It is rather the other way about; it is the complainants who are making new demands on it, such as were not in the air at all at the time the Institute was founded. In their enthusiasm for art they have our entire sympathy, but we do not see that the Institute can be, in its official capacity, an instrument for raising the standard of architectural design and architectural taste in the country, or for setting up any special standard of excellence in design as a condition of membership. The Institute is not an Academy of Arts, and was not founded to fulfil any such function. It was founded, as the Charter says, "for the advancement of the art of architecture," but that end can hardly be attained by official machinery, or by the endeavour to base claims for membership on a standard of artistic taste which it is impossible to define, and in regard to which, perhaps, no two people would exactly agree. It can only set up a technical standard, and this it has been endeavouring to do with more precision than formerly—an endeavour in which it merits more support than it has received. The advancement of architecture in the artistic sense is rather to be attained by the promotion of the study and consideration of architecture in its higher aspect. And in this respect it does not seem to receive the support of those who profess so much interest in this view of the subject. A recent paper on early architecture in this country, for instance, a subject of the greatest interest and entirely above mere professional considerations, was read to nearly empty benches. Where, on that evening, were the sixty Associates whose names we see appended to the circular addressed to candidates for seats on the Council? Not at the meeting certainly, or it would have been a well-attended one. Those who desire to see the artistic side of architecture more prominently considered at the Institute would gain this end better by giving their co-operation and support to papers and discussions on the higher class of subjects, than by demanding an official recognition of artistic merit which it is impossible to formalise logically, and which it is practically beyond the powers or the province of the Institute to carry out.

COMPETITION DRAWINGS FOR PROPOSED NEW ASYLUM AT HENDON.

 HIS hospital is about to be erected for the managers of the Central London Sick Asylum District, who represent and are elected by the Guardians of the Westminster Union, the Strand Union, and the united parishes of St. Giles-in-the-Fields and St. George, Bloomsbury.

The accommodation specified by the managers to be provided by the competing architects comprises eight general wards of twenty-eight beds each, eight small wards of two beds each, two small wards for noisy patients of two beds each, two large wards for measles of two beds each, and one large lying-in ward of two beds.

Six architects were invited to compete, and of these Messrs. John Giles, Gough & Trollope, Messrs. C. & W. Henman, Mr. Alfred Williams, Mr. Charles Bell, and Mr. Williams Cross have submitted designs.

The Managers have selected for the first premium of 100*l.* the design by Messrs. John Giles, Gough, & Trollope, and for the second of 70*l.* that of Messrs. C. & W. Henman, and an honorarium of 25*l.* has been paid to each of the three remaining competitors. In making their award the Managers were assisted by a careful report from Mr. C. J. Shoppee as to the manner in which the stipulations and requirements were met by the various competitors.

The design by Messrs. John Giles, Gough, & Trollope well merits the position it has obtained, being both in general arrangement

and in detail clearly superior to the plans of other competitors.

The administration block, of course, forms the central feature of the plan, with the male wards on one side and the female wards on the other. In this central block is placed on one side the board-room and all the offices connected, and on the other side the receiving wards with all their necessary adjuncts, whilst the common day-room for patients is placed between these two projecting wings to the rear.

At the back of the common-room runs one straight corridor north-west to south-east, from which all parts of the Asylum lead off. The rear portion of the administration block on the other side of the main corridor contains the kitchens, sculleries, and stores, the matron's department to the left, and the steward's to the right.

At the rear of the administration block, and connected thereto by covered corridors, are the laundry and the engineering department, the former to the left, and hence, with its approach, under the control of the matron, and the latter to the right, and so supervised by the steward.

At the rear of these buildings again, but separated by a road, are the mortuary and the steward's house.

The nurses' home and the medical officer's house are distinct buildings, the former at the extreme left of the female side and the latter fronting the administration block.

We cannot afford space to fully describe the detail of the planning of the administration block, but must content ourselves by characterising it as a triumph of masterly and skilful arrangement.

In the ward unit, the sanitary apertures are placed in turrets at the end, and a small ward for two beds, ward-kitchen and stores at the entrance, and two fireplaces with Galton's stoves and ascending flues are placed in each ward, and supplemented by hot-water radiators next the walls.

The second premiated design lacks the compactness of the first in the administrative portion, which is planned in rather a rambling and disconnected manner, doubtless with a laudable intention of keeping distinct the various individual functions which go to make up the whole of an administrative department in a large institution.

In the wards the sanitary turrets are placed at the centre of the length, and the ward itself is cut off from its own bath-room and ward-kitchen by a cross ventilated lobby.

Mr. Alfred Williams, Mr. Charles Bell, and Mr. Williams Cross all sent in plans which have many points of merit, and might even be considered good if there were no better submitted; but all are, in various details, inferior to the first premiated design. Mr. Charles Bell, perhaps, approaches most nearly to the lines of the successful competitors, but as an example of points of inferiority, we may mention the provision of one entrance only to the administration block, and in the ward units the separation of wards for two beds have two windows on one side only, and hence no cross ventilation.

In a competition between experts it is little points like this which decide the question of superiority, and the successful competitors have shown their pre-eminence in very many of these little points.

NOTES.



publish in another column Mr. Pearson's report to the Dean and Chapter of Peterborough, on the state of the west front of the Cathedral, a document which ought to have serious interest for all who realise what a great possession to a nation is a great building. It is evident from Mr. Pearson's report that there is no time to be lost if we are to avoid the necessity of pulling down the west front to rebuild it securely; a contingency which we should regard as almost as bad as its actual fall. We know, of

course, that we should be told that the majority of the stones can be numbered and used again; but will they be? And even then would the front, reset in this way and with a good deal of new stone-work blent with it, ever be the same to us as the original? When we consider the absolutely unique character and design of the front, the idea of its loss or rebuilding is something to be fought against at all costs; and it is to be hoped that there is still time for judicious and careful repair to render it stable for a long time. An interesting point in Mr. Pearson's report is the suggestion that the main piers of the porch, which lean over at a greater angle than the work above them, had settled out of the perpendicular whilst the building of the front was still in progress. It appears that internally there is little appearance of the front masonry parting from the vaulting; nothing at all equal to what would have been produced if the front had settled outwards to the present extent after it was entirely completed. Taking into consideration all that we now know as to the careless manner in which Mediæval foundations were formed, nothing is more likely than that the piers should have settled almost before they were finished; and that the settling should be quietly ignored as of no great consequence, and the building proceeded with as if nothing had happened, is equally in accordance with Mediæval precedent. Curious that the same men should have been such great building artists and such bad engineers.

THE *Classical Review* for May records some important discoveries at Selinonte. The foundations of a temple near to the Propylæa of the citadel have been laid bare: it has no peristyle. A large portion of the north wall, built by Hermocrates in 409 B.C., has also been discovered, and some remains of an earlier period. In the foundations of the temple a vast mass of terracottas, bronzes, and fragments of glass were found, among them lamps to the number of 10,000; also a head of Greek marble, important as resembling the head of Zeus in the well-known Zeus and Heva metope of Selinus; an archaic dedication to Demeter the fruit-bearer (Malophoros), a title known from both Euripides and Pausanias, but never, we believe, found before in an inscription; fragments of a terra-cotta relief with a representation of Nereids carrying the arms of Achilles, and probably belonging to a kind of perirrhanterion; also several hundreds of Campanian coins in excellent preservation.

WE may direct attention to the correspondence from Mr. Macvicar Anderson and Mr. Caröe, on another page, in regard to the Willesden School Board competition, in which the former was the assessor and the latter the candidate selected by him. The correspondence seems to show a most determined intention to ignore the assessor's opinion entirely, and obviously for no good or valid reason. As we have always said, there may be cases in which a competition committee, while giving every weight to an assessor's advice, may have a good reason for dissenting from it, and we cannot expect those who are to pay for and use a building to part with all choice in the matter. Therefore we cannot support *in toto* the suggestion at the close of Mr. Caröe's letter, that architects should only compete on a direct understanding that the assessor's award should be accepted. As a hard and fast rule that will not work. What we have a right to expect is that all reasonable weight should be given to an assessor's opinion, and that a good and open reason should be given for declining to accept it. But there is no evidence of anything in this case but a dogged determination to give the competition to a particular architect, against the real interests even of the committee themselves. The facts as stated by Mr. Macvicar Anderson can lead to only one conclusion.

THE Industrial Exhibition at Berlin is now a certainty, and the promoters propose having the inauguration early in May next year. The numerous difficulties as to the scope of the exhibition, its site, and the Government and Municipal subsidies have been overcome. As stated in a former number, the Treptow suburb has been decided upon, and a site of about the same area as the Paris Exhibition of 1889 has been put at the disposal of the Exhibition Committee. The River Spree forms one of the boundaries of the site, and, at the same time, gives ample opportunity for passenger-steamer traffic from various parts of the city. On two other sides, the boundary of the grounds is formed by railway-lines, which allow of a passenger traffic of about 30,000 passengers every hour by the local and suburban trains. There is also a line of tramways, and we understand that the cars will be worked by electricity. The completion of an electric overhead railway to Treptow, now in course of construction, is, however, unfortunately very doubtful. From a plan illustrated in our official contemporary, *Centralblatt der Bauverwaltung*, the grounds appear to have been very cleverly laid out. This has been no easy matter, as a number of roads run through the grounds which could not be touched, and part of the site is wooded. The scope of the exhibition is distinctly limited to the Berlin industries, and the area of the buildings required is hence small compared with the extensive grounds. The principal building will be in the form of a central gallery with wings, a machinery hall, and a large domed space for ceremonials. Its superficial area will be 40,000 square metres. There will be separate buildings for the chemical trades (with a lecture-hall), for the river fisheries, for hygiene, for municipal government, and for the victualling section, and there will be a model theatre for an audience of 1,700, and a large assembly-hall. In laying out the site care has been taken to keep separate everything that can be said to have the fair or bazaar element in it. With the exception of "Old Berlin," these entertainments, stalls, &c., will only be allowed on certain sites outside the exhibition area proper. In the design of the buildings care has also been taken that the appearance shall be that of temporary structures, and no imitations of palatial buildings, run up in plaster, will be allowed. We consider both restrictions very satisfactory. Messrs. Griesebach, Hoffacker, and Bruno Schmitz have been retained to act as joint architects to the committee, and may also be considered entirely responsible for the arrangement of the grounds.

THE compromise made at the London County Council in regard to the Betterment question was ratified by the House of Commons on Monday. We have already noted the few points of the compromise which appear, as we have said, to be a fair one. It was urged in the debate that the area of Betterment ought not also to be the area of Worsement, but it is desirable to have some definite area, and there appears to be no reason why that should not be one and the same area for both purposes. The most striking objection was the theoretical one that the House ought not to override the decision of a Select Committee. There is a good deal to be said in favour of this view, since such alteration of the decision of Select Committees weakens their authority. It is quite possible, however, that the Committee, if they had had the terms of the compromise before them, would have agreed to it, and it was clearly undesirable to keep up the already long Parliamentary struggle when all parties had arrived at a fair agreement.

THE electric lighting works of the Corporation of Leicester show that the scare about the "antiquation factor" is beginning to wear off. At one time it was almost impossible to get a municipality to

take up proposals for electric lighting, as so many systems had to be chosen from, and so many improvements in machinery were continually being made that a large and unknown "antiquation factor" had to be taken into consideration. The works at Leicester are amongst the finest in Britain, and the engine-room is a revelation to anyone accustomed to the ordinary "make-shift" look of the engine-rooms at electric lighting stations. The roof of the engine-room is supported by wrought-iron principals and pitch-pine rafters, and the floor is paved with tessellated tiles. A dado of match-boarding with moulded cap and skirting, and stained and varnished to match the roof, surrounds the room. All the unsightly steam-pipes and conductors are hidden away in the basement under the flooring. The alternators are of the Mordey-Victoria type, and their finish is in keeping with the handsome appearance of the room. They are similar to those at the Bankside station of the City of London Electric Lighting Company. The works are about one and a-half miles from the centre of the town at the Aylestone-road Gas Works. They were designed and laid down by Mr. Alfred Colson, the gas engineer to the Corporation. The action of the Corporation in supplying electric fittings to their customers has given rise to numerous protests in the local newspapers. That they make some small profit in their trading, which goes towards the loss at present incurred in supplying the light at sixpence per unit, is hardly a sufficient reason for competing against local firms, as the saving in the rates is infinitesimal. Not only have the local firms to pay rates which are used to provide capital to set up a business to compete against their own, but also all the tests of the fittings are made by the Corporation inspectors, and the whole weight of municipal influence is dead against them. They have a real grievance, and the expediency of the action of the Corporation may well be doubted. This is another example of that questionable interference of Corporations with matters of private enterprise of which we spoke in an article in our issue for May 18.

A SECOND report by Dr. S. W. Wheaton to the Local Government Board, upon the causes of diphtheria in the Hinckley Urban and Rural Districts, states that considerable improvements have recently been effected in the sewerage of the town. More attention has been paid to the flushing of the sewers, and those sewers which were in an especially foul condition previously are now free from deposit. Much, however, remains to be done in order to place the sewerage of the town in a satisfactory condition; especially the replacing of old brick culverts by proper drains. Dr. Wheaton urges that the attention of the Urban Sanitary Authorities should be directed to the defective construction of house drains in parts of their districts; and that they should cause a systematic inspection of the house drains to be made, and any which are found to be defective should be replaced by pipe drains, and that all yards and open spaces immediately about houses should be properly levelled and paved, or laid with suitable materials, so as to secure efficient drainage and cleanliness.

THE paper on Village Water Supplies recently read by Mr. R. E. Middleton at the Surveyors' Institution, has been issued, with the discussion on it, in a pamphlet form.* It is an exceedingly useful and interesting paper on a very important subject, and contains, besides advice and theory, a considerable amount of statistical information. We have constantly noted, in the reports to the Local Government Board on the sanitary condition of various districts, that inadequacy of water supply, and absence of means for a proper supply, is one of the most common causes of the prevalence of a low sanitary condition in the district. Mr. Middleton endeavours to show how such

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supplies can be obtained in the least costly manner. The chief opposition to the establishment of a new supply generally comes from the inhabitants themselves, who are always afraid that a new water supply will saddle them with new expenses, and will haul the worst water out of the deepest well rather than face the need of a better supply. A paper showing the most economical methods of getting such a supply is therefore of the highest practical importance.

IN the sale, which extended over five days of last week, of the late Viscount Clifden's collection were comprised the set of paintings by Guardi, bought in Venice by George, first Baron Dover, and some interesting examples of architectural pictures by Canaletto, Scott, Pugh, Hogarth, and others. Pugh shows old Covent Garden, looking westwards, with the central column, carrying dials, which was erected in 1668, and whereof the gilded ball afterwards belonged to John Kemble; also Lord Orford's house, now tenanted by a sporting club, with its original façade, since altered. The dial column is also depicted in Hogarth's painting of the Vegetable Market, looking up towards Russell-street, and taken from beneath the portico of St. Paul's, Covent Garden. A painting, the artist unknown, catalogued as "A View of the Mall, St. James's Park, with old Whitehall Gateway," is particularly worthy of attention, for it represents the old Tilt Yard, as seen from south of Spring-gardens, with the former stables and barracks built by Charles II. for the Household Cavalry, but pulled down in 1751 for the Horse Guards offices. What we may call the old Horse Guards appears as a red brick building, with turret and clock, very similar in design to its successor: it is strikingly different from the structure as depicted in the painting, engraved for Pennant's volume, showing Charles II. and his dogs in the foreground. This latter painting was then in the collection at Wimpole. Two large canvasses (5½ ft. in. by 36 in.), by Scott, show the river as seen by one turned towards St. Paul's, and towards Lambeth. The former is taken from an elevated position (perhaps the top of Denmark House) eastwards of the Savoy; it shows the river-side terrace and boat-stairs of Denmark House, and much more of Wren's spires and towers than would be possible, we think, from the river level there, after allowing for a curve of the shore. The companion painting is of the entire length of old Westminster Bridge, the Abbey, St. Margaret's (with a cupola surmounting the tower), Lambeth House in the background, and so on, as seen from mid-stream below Whitehall. There was a smaller picture, by Scott, of the same subject. Paintings of this kind illustrate London's history, and should be secured for the nation. W. Hunt's view of St. Martin's Church is curious, for the point of view is an uncommon one: being the back of, Carlton House-terrace, that is to say, the raised offices overlooking the Park. We may cite, too, Canaletto's panel-painting of Charing Cross and Northumberland House, his Bridge of Verona, and portrait of himself. It was interesting to compare the numerous pictures of Venetian scenes—the Piazza, Grand Canal, Doge's Palace, and so forth—with Miss Clara Montalba's more recent rendering of St. Mark's, which happened to be at Christie's Rooms, just over the way.

LETTER FROM PARIS.

THE Galliera Museum has just opened its doors to the public for the second time, for a private exhibition. This is the last exhibition of the kind that will be held there, before it becomes the Museum of Industrial Art of the Ville de Paris. The first time, the exhibition consisted of portraits of ladies, the profits of which went to a charitable object. This time the object is to celebrate the centenary of Corot. A monument is to be erected in his memory, the execution of which is to be confided to the sculptor Henri Cros. His statue or bust is to be placed in the Parc Monceau. In truth his real

monument, that chosen by himself, and which agrees best with his modest character, is the white stele decorated with his medallion erected on the edge of the pond at Ville-d'Avray, in the country in which he lived so long, and where he loved to paint scenes which were always veiled with a light mist. The State, provincial museums, and amateurs, both foreign and native, have contributed to this exhibition, which comprises 143 pictures, but which is in reality only a compendium of Corot's work. It is very interesting, and shows the evolution of the talent of the master. For Corot was always learning, and even at the times of his most brilliant successes he was feeling his way, and was hardly able to show his full individuality. It is this which explains the great difference which exists in his earlier works, "Democrite et les Abbatins," which was in the Salon of 1841, "Homère et les Bergers" (Salon of 1845), "Jésus au Jardin des Oliviers" (Salon of 1849), and the more recent landscapes, where the light foliage of the poplars and willows sifts the morning light into a fine and delicate grey. It is remarkable that amongst all his pictures there is not to be found the heavy and dark foliage of the oaks, so much loved by Theodore Rousseau, Diaz, or Jules Dupré, nor the warm and glowing colour of the south; what he revelled in was the bright effects of the rising sun or the uncertain tints of the twilight. There is a certain sadness in his pictures which does not recall either the brightness of spring, the glow of summer, nor the richness of autumn. It seems as if there had existed for him a sort of intermediate season where the brightness and sparkle of nature was always enveloped in a light veil, through which here and there the red kerchief of a peasant shines out.

Amongst the works lent by the museums, we may mention a "Vue de Ville d'Avray," belonging to the Museum at Mans, a "Soleil Couchant" from the Nantes Museum, and "Les Langes de Ville d'Avray," belonging to the Museum at Rouen. Amongst the number of pictures belonging to private collections may be mentioned the "Vue de l'Hôpital de Beauvais," executed in 1833, and belonging to M. J. Blanche. There are also three lovely pictures lent by M. Archibald Coats, "Le Soir," "La Danse des Nymphes," and "La Ronde d'Enfants." "Le Lac" from the collection of W. Coats, "La Femme au Tigre," which figures in Brussels, in the collection of M. Dekens, "L'Allée Ombreuse" of M. Donat, "L'Effet de Lune" from the Grunbaum collection, the "Matin Frés de la Mer," lent by M. Ch. Roberts of London, and quite a series of beautiful pictures lent by M. Henri Vevev.

There is an interesting little exhibition now going on in the Durand Ruel Gallery, which is quite worthy of a visit. The whole is strange, and often incomprehensible, but a certain number of the pictures are remarkable and powerful. We speak of the works of M. Claude Monet, which consist of forty-nine pictures, mostly landscapes. Amongst them we noticed twenty views of Rouen Cathedral. The artist is very fond of painting the magnificent architecture of the doorway at every hour of the day: at one time in the morning, taken with the sunlight playing on the delicate stone carving; then again he shows it enveloped in a fog, and then standing out against a winter sky. They are only simple architectural impressions, and require to be looked at from a distance, and even then they appear very extraordinary to the general public; nevertheless they exhibit evident sincerity, a genius for colouring, and effects, which, though they may be bizarre, are worthy of serious attention. M. Monet has applied the same treatment to the landscapes taken in the mountains of Norway, but they do not offer the same qualities of colouring as his paintings of the old Gothic cathedral.

The Government has submitted to the Municipal Council of Paris the question of the 1900 exhibition. The Municipality will have to pay a large sum towards the expenses of the exhibition, which will amount to about 100 million francs, of which 60 millions are provided by a guarantee society. The remainder will have to be contributed by the State and the City of Paris. It is now decided that the principal entrance to the exhibition will be on the right bank of the Seine, at the angle of the Place de la Concorde, and the Cours la Reine. A State entrance will also be formed at the Champs Elysées, at the entrance of the new avenue which will conduct to the Esplanade des Invalides. On the present site of the Palais de l'Industrie two buildings will be raised; on the right the Palais des Beaux-Arts, containing a large glass covered court 100

mètres long, and oval in plan, where future horse shows and horticultural shows can be held amid a very effective architectural framework. On the left will be the pavilion of the City of Paris, separated from the Palais des Beaux-Arts by a large "rond-point," whence the projected new avenue will start. It is in this quarter, according to M. Bouvard's plan, that the fine art section and the retrospective exhibitions of Art and Education will be grouped. On the other side of the bridge will be the pavilions dedicated to State manufactures and to industrial art. The quays on the left bank, totally transformed, will receive a long range of constructions with double façades, those towards the river with wide terraces in front of them. Cafés, concerts, theatres, &c., will find place here, as well as the reconstructions of historical monuments. The Colonial Exhibition, formerly on the Esplanade des Invalides, will be disposed in the Trocadéro Park, communicating with the Champ de Mars by the Pont d'Iena, which will be considerably enlarged.

On the Champ de Mars it is proposed to construct a series of palaces, designed with a view to total effect, as well as to individual design. Each building which contains exhibits of a special class will be constructed so as to utilise, as far as possible, for its exterior decoration, the class of materials exhibited in it. The park of the Champ de Mars will be reserved for grand fêtes, as well as the Galerie des Machines, which is to be preserved. The machinery exhibition will occupy the whole circumference around the double row of palaces on the Champ de Mars, with the Palace of Electricity in the centre. Such is, in brief, the scheme as agreed on by the managing committee, and which now has to be discussed by the Chambers and by the Municipal Council.

The voting for the "médailles d'honneur" at the Champs Elysées Salon has just been gone through. In architecture the medal has not been awarded, none of the recipients proposed having obtained a majority. The medal in painting has been awarded to M. Ernest Hébert, for his picture "Le Sommeil de l'Enfant Jésus," the other candidates named being MM. Henri Martin, Henner, Vollon, and Harpignies. The sculpture medal has been given to M. Bartholdi, author of the group "La Suisse Secourant les Douleurs de Strasbourg." At the Ecole des Beaux-Arts the subject given for the "concours de Rome," in the architectural section, is "A Palace for Exhibitions and Fêtes." The public exhibition of the designs, and of those in the painting and sculpture sections, will take place at the end of July or beginning of August.

The Department of Fine Arts has purchased for the Luxembourg M. Dettaille's large picture in last year's Salon, "Les Victimes du Devoir," a scene at a fire. The obvious destiny of such a picture was official purchase, but it would have been much in place in the Fire Department building of a Town Hall than in the Luxembourg, which is essentially a museum of art. It is not a very interesting work from the artistic point of view. The Municipal Administration have arranged to set up the bronze group left to them by the late M. Cain, of an eagle and a vulture fighting over the body of a bear, on an artificial rockwork in the Square Monholon, with a waterfall or fountain beneath it.

To give an idea of the extent of architectural work being carried out by the Municipality of Paris, it may be mentioned that the money to be expended on new school buildings in Paris during 1895-6 is estimated at 30 million francs, for 87 buildings to be erected this year and 28 in the following year. About 52 millions will have to be expended to complete the new school buildings required for Paris.

THE ARCHITECTURAL ASSOCIATION: THE INFLUENCE OF ARCHITECTURAL STYLE UPON DESIGN.

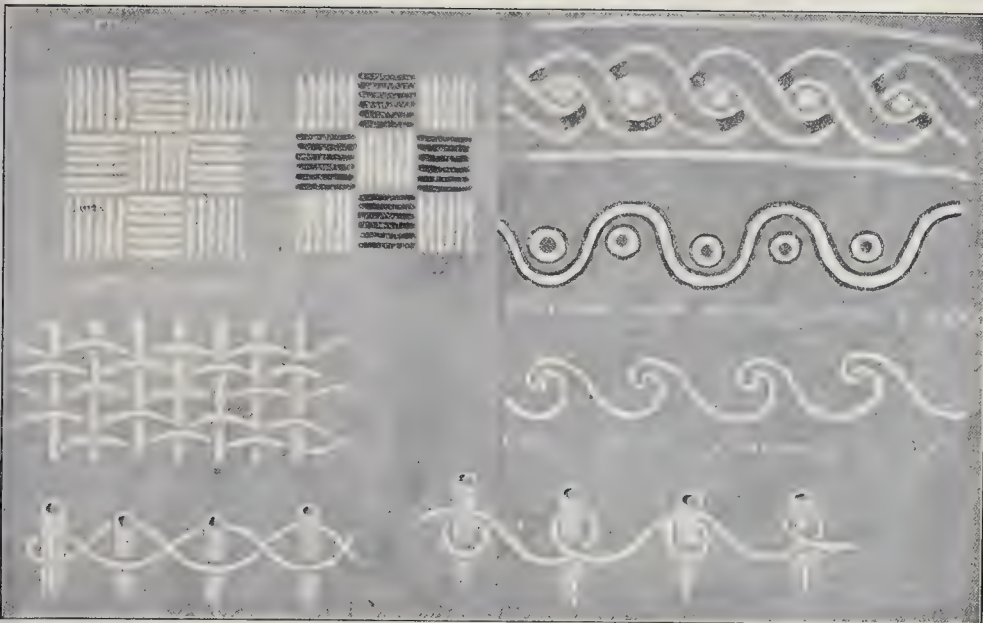
THE ordinary meeting of the members of this Association was held on the 24th ult., in the meeting-room of the Royal Institute of British Architects, Mr. E. W. Mountford (President) in the chair.

A donation to the library from Mr. J. T. Perry was announced, and a vote of thanks passed to the donor.

The Chairman proposed a vote of thanks to Messrs. Earle and Sim, and to the gentlemen who took part in the Burlesque at the Soirée on the 16th inst.

A vote of thanks was also passed to Colonel Balfour and Captain Whyte, of the London Scottish, for the use of their Hall.

It was announced that the annual dinner had been postponed until Friday, the 14th of June. Many gentlemen wished to be present, who were



Relation between Early Construction and Design.

ing out of town, and there was no other course left but to postpone the dinner for a fortnight. The dinner would take place at the Holborn restaurant, and the tickets already issued would be available for it.

The Chairman also announced that the Royal Institute of British Architects had once more generously consented to make the Association a grant of 100l. The original vote was 100l. per annum for three years, and it was understood that at the end of the term the vote would be reconsidered. The result had been that the vote of 100l. was again given for the coming year.

The report of the scrutineers was then read, with the following result:—Number of papers sent in 275, of which 9 were rejected as irregular. The result of the election was as follows:—President, W. D. Caröe, M.A., F.S.A.; Vice-presidents, Messrs. G. H. Fellowes Prynne and F. T. W. Goldsmith; Ordinary Members of Committee, Messrs. E. W. Mountford, 242 votes; A. B. Pite, 222 votes; F. G. Hooper, 177 votes; J. Begg, 161 votes; Owen Fleming, 74 votes; W. H. Seth Smith, 150 votes; E. Woodthorpe, 157 votes; Theo. Moore, 156 votes; Hon. A. McGarel-Hogg, 109 votes; A. W. Carle, 105 votes. Hon. Treasurer, Hampden W. Pratt; Hon. Librarian, J. W. Stenhold; Hon. Secretaries, B. F. Fletcher and A. H. Hart. The above form the Committee. Other Officers:—Hon. Solicitor, W. H. Jamieson; Hon. Assistant-Librarians, C. H. Freeman and E. W. M. Wonnacott; Hon. Auditors, E. H. Sim and F. G. W. Buss; Assistant Secretary and Registrar, D. G. Driver.

On the motion of Mr. Goldsmith, a vote of thanks was passed to the scrutineers.

Mr. Greenop next proposed a vote of thanks to the retiring officers, and notably to the President and Vice-Presidents.

Mr. R. Phene Spiers seconded the motion, which was carried by acclamation.

Votes of thanks were also passed to the Honorary Secretaries, to Mr. H. W. Pratt, the Honorary Treasurer, and to the Honorary Librarian and his Assistants.

Mr. Walter Crane then read the following paper on "The Influence of Architectural Style upon Design":—

It seems tolerably obvious that without shelter of some kind, without walls or roof, without suitable materials, determined limits, proportions, and prepared surfaces, the art of the decorative designer, whether in sculpture or painting, or any other method of expression, could not have much chance of serious development, historic continuity, or permanent existence. The natural

walls of cliffs and caves might be utilised certainly, as they have been in pre-historic times; bold tribal ensigns, such as the "White Horse," cut through the green turf on the chalk, in a kind of natural sgraffito, as it appears upon the Wiltshire down, might exist (with periodic scouring) for ages; but it is only with the development of the constructive art that organic ornament springs to life; only with the squaring and joining of timbers, the moulding of bricks and tiles, and the cutting and dressing of stone, and their use under the constructive necessities of a building, that the sense of relation or proportion is born, without which we could have no fine art at all.

It may be an open question whether the impressionist individual graphic sketcher, or the constructive associated craftsman designer, represented the primitive artistic condition. We are apt to colour history as well as art by the tint of our own sympathies—but judging from the fragmentary sgraffito of the cave-men it would almost seem as if the former were the first in the field, and that man only slowly found his way to the harmonious related and ornamental forms of art after he had made some progress in the construction of the primitive dwelling.

It seems highly probable that from the material and method of construction of the wicker and wattled walls of the primitive hut were derived motives for some of the first types of pattern design.

The primitive hunter-artist might scratch the forms of the reindeer and mammoth upon the bone handles of his weapons; or the herdsman-astronomer cut the signs of the sun and moon, of fire and water upon clay or stone; but the sense of rhythm and harmonious recurring line would have to be learned in following the useful craft of the rush-plaiter and basket-maker, to whose simple constructive methods we owe at least two important plans of ornament—the chequer and the spiral meandering line. Their value, too, has never been forgotten in ornamental work, and when man learned to work stone and bronze he still perpetuated these primitive motives.

In considering the bearing of the architectural influence upon decorative design of all kinds, which is so marked in all historic art, we may conveniently adopt Mr. Ruskin's three broad and main divisions which indicate the fundamental differences of constructive principle in architecture, namely:—

- I. The architecture of the lintel.
- II. The architecture of the round arch.
- III. The architecture of the pointed arch,

of view by their leading ornamental spaces, or features, we might distinguish them severally as:—

I. The architecture of the frieze and pediment.

II. The architecture of the spandrel and dome.

III. The architecture of the vault and window. Of lintel architecture ancient Egypt gives us the most massive examples, but it seems most probable, even here, that stone construction only followed wood, or rather, reeds and clay, and that the types and systems of ornamentation were originally suggested by those materials.

If we look at the primitive Egyptian house, planned for a hot climate, built by the great river-side, of materials furnished by the river itself, we may see the type of the massive Egyptian temple column (in the clustered reeds fixed at the angles); this but represents, in stone, and more formally, a bundle of lotus reeds bound together by fillets of rushes, with the bud and flower clustered at the top to form the capital. The coved cornice of the flat mud roof made of rushes, is perpetuated in the painted cornice of the pylons of the great temples, as at Edfu and Philæ.

The mud wall built in layers filled in between the frame-work of reeds with its horizontal and vertical divisions marked by them, may also have suggested the sub-divisions of the stone-wall to receive the hieroglyphics and figure-paintings, but with the adoption of stone structure came stone sculpture, and the temple walls are regarded as great surfaces for the permanent record of the mysteries of religion, of the powers and attributes of gods and kings, of their wars, and conquests, and of the labours of the people upon which the wealth and power of empire always rest.

The Egyptian wall-reliefs were sunk, the outlines being hollowed and the edges of the figures rounded, so that they never projected in relief beyond the surface of the wall. We may consider this an elementary stage in the evolution of relief sculpture, but undoubtedly the broad and massive monumental look of the walls, which is so marked a feature of the Egyptian style, owes its character to this treatment.

The statues have the same simple, broad, massive architectural character, as if they were the half-emerged spirits of the changeless stone itself, placid of countenance, and tranquilly indifferent to the passage of time; they impress us with their sublime dignity, which belongs alike to their sphinxes and lions which guard the portals as to the small portrait statue. Even where these latter show an extraordinary realism, as in the famous scribe of the Louvre, with the eyes of rock crystal, quartz, and bronze—a work of the early empire—they are still under the influence of

this architectural control, simplicity, and reserve, which seem to me to give dignity to all Egyptian art.

The Egyptians, though acquainted with the use of the round arch, did not use it as an architectural feature, like the Assyrians in their palace gateways, and who also, according to Viollet-le-Duc, used the round brick vault to support the roof of the interior large halls of these palaces; but the sculptor was the chief decorator in the Assyrian palace. He kept the door with his mighty winged bulls, man-headed, meeting at the angles, and facing outwards in a formidable way, their general design controlled by the rectangle of their position and architectural purpose; and he covered the alabaster wall slabs with delicately-chiselled reliefs, in which the story of his times and the customs of his country is graphically, if somewhat rigidly, told.

The ancient Persian depended largely for his architectural effects upon lintel and column. The peculiar form of the typical capital suggesting its origin in the timber beam houses of the Medes, with forked tree stems supporting the beams of the roof.

The wall decoration of glazed bricks from the ancient fortress and palace of Susa shows the Persians to have been accomplished workers in that material, and to have been early distinguished for their ornamental and colour sense. The frieze of archers moving in severe profile along the battlements of the fortress forms a striking decoration, and at the same a remarkable illustration of the architectural influence, since the decoration not only shows this in its design, but could not have existed apart from the actual wall and its construction. The very joints of the bricks help the general effect and vary the surface. Design, colour, and modelling are here one with structure. The figures appear to have been pressed upon the clay or other material while soft, from wooden moulds, and then divided into bricks; the bricks being long in proportion to thickness. The colour surface of the turquoise blue of the ground is very varied, being put on in small round flattened disc-like patches. The figures are alternate as to richness, patterns, and colour, though alike in attitude. The small repeated device, enclosed in lozenges upon the coats of the alternate archers, is supposed to represent the fortress of Suza itself, in an heraldic sort of way.

In the palm-leaf like running border, as in a similar design of frequent occurrence in Assyrian ornament, we see the type afterwards developed by the Greeks in the Anthemion, who must have been largely at first under Asiatic influence. To the Greeks, too, we owe the simplest and most refined type of lintel architecture in the Doric temple, which was apparently evolved from a timber-built shrine or tabernacle, the triglyphs which divide the external frieze into panels, representing the ends of the cross beams. These, with the vertical grooves, serve as a framing for the sculpture, which, as in the Parthenon, filled the metopes or spaces between them. The low-pitched roof terminated in a pediment, and these pediments again afforded a space for sculpture. In the arrangement of the groups which filled the eastern and western pediments of the Parthenon, shattered as they are, with the assistance of Carrey's drawings, we may detect the controlling influence of architectural line. In fact, figure-sculpture intended to be placed in a pediment can only fill its position when it acknowledges this control, since the groups, however varied, must be enclosed by the rigid boundary of the space, running into extremely acute angles at each end.

The subject was the contests of Athene and Poseidon for the patronage or protection of Athens, and both pediments were significant and symbolical of all that the Athenian citizen held dear. In the eastern pediment we have the fragments of a great sculptural and decorative epic, the central point of the birth of Athena being lost, but in the figures and groups that remain I think it is clear how constantly in the controlling lines, both of groups like the Fates and in single figures like the Theseus, the long sloping angles of the pediment recur through infinite variation, and give harmony and relation to the whole work, from the extended arms of the sun-god rising in the extreme angle, driving his horses, whose heads emerge from the sea, to the descent of Selene, with the horses [of night, in the corresponding angle.

We find here that great principle which holds good throughout all design—the principle of recurring or re-echoing line, which governs both the disposition of masses and the arrangement of detail.

We may trace the indications of the same

feeling in the design of the metopes, and of the famous frieze of the cella, which is still more decidedly ornamental in its lines, and might almost have been planned upon those of a running rhythmical scroll border. There is, of course, in practice all the difference in the world between working consciously and dryly, according to fixed principles, and working inventively and freely under the influence of architectural geometric lines and spaces. To acknowledge the existence of natural laws in art is a very different thing to being a slave to an academic tradition, as in art there are generally a variety of ways of solving a particular problem.

It may be said, indeed, that however beautiful these sculptures are, as individual figure-sculptures, and regarded solely as such, they are strictly architectural ornament and parts of a whole, and their distinction of style is, I venture to think, largely owing to that fact. The truth is that the human figure was really the ornament of the Greeks. Their types of strictly ornamental pattern in the ordinary sense were extremely limited and mostly derived from Asiatic prototypes, however refined upon and perfected by delicacy and precision of workmanship. But in figure design they were free and inventive, and whether the aim of their artists was to produce a terra-cotta statuette, to paint a vase, to carve a marble statue or a frieze-slab, we find the same extraordinary feeling for grace and appropriateness and sense of controlling line.

Another point we may note about these Parthenon sculptures, true of the use of sculpture in the classical temple generally, is that they are not used to emphasise what I should call the constructive features, but to fill the interstices of the construction. The building stands without them; or I suppose few would be prepared to justify their presence in the British Museum if they were there at the cost of the fall of the Parthenon; though there are many who do so now, although they are there at the cost, practically, of its artistic destruction. That to say the building without its sculpture is somewhat like a man with his eyes put out.

Close by, however, we find an illustration of the opposite principle, the sculptural emphasis thrown upon the constructive necessities, in the caryatid columns of the Erechtheum. In these we have a notable instance of the union of sculpture and construction, and it is evident that in the treatment of these figures the sculptor has strongly felt the necessity of architectural massiveness, simplicity, dignity, and reserve. They each support the cornice upon an abacus and cap, and the columnar vertical feeling is expressed by their erect attitude, slightly varied individually by the severe vertical lines of their draperies.

The caryatid idea is, no doubt, a most difficult one to treat satisfactorily, and there is a sort of painful slavish suggestion about it, as of human beings condemned to support an intolerable burden. It was said of the imitation of the Erechtheum caryatides at St. Pancras Church that they might be intended for St. Pancras householders groaning under the burden of heavy rates. There is no suggestion of restlessness or pain about the Erechtheum originals, however. The idea constantly recurs in Renaissance work, though without the Greek simplicity and reserve which alone makes it tolerable.

The prototype of the sculptural pediment may, perhaps, be found in the sculptured slab placed to fill the hollow left by the relieving arch over the massive lintel gateways of the ancient cyclopean buildings in Greece, as at the gate of Mycenae. In the sculptured lions and column we have, too, a simple exemplification of the symmetric principle in design; as well as of that recurrence or re-echoing in the design of sculpture of the lines of the enclosing space.

The architectural influence is marked enough in the design of the accessories of Greek life, as, for instance, chairs and couches, lamps and pitchers, though the forms are adapted and proportions varied, not as in later work, for instance, candlesticks, which in the Queen Anne period often actually imitate in metal the proportion and details of the classical column.

The columnar idea is carried out in the bronze tripod standards used for lamps; it reappears in the supports of seats and chairs, and the figure-frieze is used as a system of decoration for vases. With the use of the round arch other elements and principles were developed in decorative design. Under the Romans the capital, columns, and cornice became more ornate in design, and this necessitated a more strictly ornamental treatment of the frieze, which became continuous, and unbroken into panels by triglyphs. And the garland, or swag, as we term it, originally a

temporary festive adornment, became a permanent decoration, valuable for its recurring graceful line, especially as adapted to the friezes of round temples and tombs—like the Sybil's temple, and the tomb of Cecilia Metella—vertical lines being obtained by the pendant ends and ox skulls, though the tradition of the ancient timber construction was still retained in the egg and tongue and dentil mouldings, which had long become purely decorative enrichments.

The pilaster and cornice were also added to the architectural decorative resources, which were further enriched by the addition of such suggestive spaces for the painter and sculptor as the lunette, the spandrel, and the medallion; while the decorative value of inscriptions was fully realised with the use of the dignified and severe form of the Roman capital letters, re-echoing the vertical lines and angles of the architecture.

The fusion of Classical and Oriental feeling with Christian mysticism in Byzantine architecture, which came in with the use of the round vault and dome, opened a new field for that most splendid material, mosaic, which became, *par excellence*, the principal means, as well as the glory of the interior decoration of Byzantine buildings. In the churches of Ravenna and St. Mark's it dominates or takes the place of all other decoration, its impressiveness being largely due to this, and one feels it to be sufficient in itself. The concave surfaces of the vaulting affords a peculiar appropriate field for the most effective use of the cubes of coloured and gilded glass, by means of which the designs are built up. The very method of mosaic work harmonises it at once with the craft of building, of which it becomes a part. It is a constructive method of surface decoration entirely in harmony with architectural construction; capable of the utmost splendour, and yet full of solemnity. The nature and conditions of the material seem to place natural limits upon its graphic or pictorial range, which, curiously enough, it appears to be in the nature of the degree of evolution of any art (or perhaps of artists) continually to attempt to overstep.

One has only to compare the decorative effect and architectural feeling of the Byzantine mosaics with the late Roman attempts to reproduce Renaissance pictures at St. Peter's to be convinced of its true artistic province and treatment, and to be left in no doubt as to which influence, that of architecture or of painting, has proved the most beneficial and inspiring to the mosaic designer and worker. We have in our own time in recent years returned to the old method of working glass mosaic as an architectural decoration, to working in on the surface, and *in situ*, as the only means of obtaining that richness and variety of surface and play of light, impossible to be attained by the mechanical method of making flat slabs of tesserae on the back of the cartoon in the workshop.

The most important piece of modern mosaic work of our time and country is that upon which Mr. W. B. Richmond is now engaged at St. Paul's Cathedral. Personally I am not in favour of modern artists decorating a building of a former age—at least in the present condition of art and craftsmanship. I should put new wine into new bottles, and artistic interest in those places most bare of it. But I think, nevertheless, Mr. Richmond and his able assistants, the mosaic workers of Messrs. Powell, are carrying out a very fine, thoughtful, and splendid piece of work, full of ability in design and conception, and technical skill, governed by the architectural feeling of a decorator, even though that feeling may compel him to mask some of the characteristics of the building he is decorating—but then comes in the modern difficulty. From the mosaic point of view one might wish St. Paul's had been a Byzantine building.

Notable characteristics in the design of Byzantine mosaic is the simplicity in the design and arrangement of masses. They are in some instances almost heraldic in their ornamental effect, and there is no doubt that the silhouette of figures or groups as thrown upon a gold ground is the most important consideration in the case of design intended to be seen from a long distance and in subdued or half light, and upon the concave surfaces of a dome.

As subsidiary to its chief decorative splendour in mosaic, Byzantine sculpture shows a certain restraint, reserve, and a linear feeling in its design, though with considerable richness of detail, as in the carving of the characteristic cushion and basket-like capitals, and screen panels of open work, which also suggest wicker and rope work motives. This linear feeling, and



lattice, wicker, and rope work motive, can also be traced in the typical carved ornament of the Romanesque work generally, as, for instance, in the mouldings of Norman arches and the caps of the shafts. These characteristics may perpetuate the tradition of the construction of the primitive buildings, in this country, of wood and wicker.

In Norman ornament, the use of recurring line and repetition of unit is very marked, and its peculiar character and richness is due to this. The zig-zag moulding itself is an illustration of the principle, and simply repeats itself in varying proportions and projections. Some of the outerings of Norman arches and arcading simply repeat the leading constructive form—the semicircle of the arch itself.

This is still more observable when we come to the architecture of the pointed arch and the gable, where the mouldings surrounding the window and door-heads repeat in projection the lines of the window and door in serving their original office of keeping the rain from the window and wall, richness of effect being gained by the variety of the alternating concavities and convexities of the section. Gothic work generally illustrates the opposite principle in the use of enrichment to that which we noticed in the Greek, inasmuch as the ornamental emphasis is generally thrown upon the constructive points themselves, rather than on the interstices.

We get the clustered and filleted shaft, the ornate foliated capital in endless variety; the richly-moulded arch, the cusped arch, the window tracery; the moulded ribs of the vaulting, their functions marked by richly-carved bosses, and, if corbel or bracket is used, the opportunity is seized by the sculptor for a head or a winged angel, but worked strictly in accordance with the size of joints of the stonework, and therefore always showing the controlling architectural influence. The exterior of a Gothic building is almost equally expressive of its construction: the buttress is made an important decorative feature and a source of variety and light and shade, often crowned with a pinnacle, and, in its flying form, supporting an apex extremely elegant in design. The door and window heads are moulded; the spring of the roof is often marked by machicolations, and the parapet battlemented or pierced. The gables are vested, towers are pinnacled and spired, and topped with vanes. This emphasis on the constructive features gives an expression of organic life, directness, and strength which is characteristic of all Gothic design.

Interstices are, of course, extensively used, as well as the tympanums of porch arches, and niches through these massed together, and superimposed and filled with figure sculpture, as in the west fronts of many cathedrals, they appear to be inseparable parts of the structure, and they aid in the lines and general feeling of their design and treatment the general structural effect, just as we have seen the sculpture of the Greek temple did, though in a different way.

Just when design was emerging from Byzantine tradition, or perhaps adding to it by fresh and simple inspiration from nature, and acquiring technical freedom, in the thirteenth century, Gothic sculpture appeared to reach a grace and vitality which relates it to the best Greek work. English Gothic sculpture has suffered so much from the destroyer and defacer that it is difficult to find complete examples to compare with Continental work, the west front of Wells Cathedral being, I suppose, the only important façade of Gothic architectural sculpture remaining in England, although there are many interesting and beautiful monuments and effigies, both early and late, scattered throughout the land, remarkable no less for their character than for their ornamental beauty and architectural feeling. But perhaps we have nothing of quite so fine a quality as the French cathedrals show, such as the central pillar of the porch of Amiens, the figures from the west porch of Auxerre, nothing of that wonderful, delicate, pathetic beauty of the early Renaissance sculpture of Italy—such as the figure of Ilaria di Lucca displays. Although among the recumbent monumental effigies scattered about in the churches and cathedrals of our own land there is plenty of fine work closely corresponding in feeling with the characteristics of the contemporary architectural design of the same dates, we get, in the thirteenth century, the recessed and richly-canopied tomb, as that of Gervaise Alard at Winchester, where the design is part of the wall itself, and where architectural detail forms a large part of the interest, but yet appropriately leads up to and frames the dignified figure of the knight reposing beneath. The idea of the recessed tomb might possibly have been derived from the Medieval bed recessed in the wall—the “shut bed” of Mr. Morris’s romances, the use of which still appears to linger in Brittany.

The shadow gained by the recess certainly gives solemnity and impressiveness to the sculptured effigy. The effigy is frequently sculptured upon an arched tomb, shields with the bearings of the family filling the panels between the arches, which

are made to subserve by their more formal masses and vertical lines the freer and more horizontal ones of the sculptured figure. Architectural design and sculpture are in these works inseparable. The later Gothic tombs take the form of shrines built clear from the wall and overhung with rich tabernacle work, buttressed, and sometimes enclosed with wrought-iron railings, in the design of which may again be seen the prevailing architectural influence of the time. An example of the latter from Wells Cathedral shows the buttress and battlement used ornamentally in the principal supports, the intermediate iron being hammered into finials of a fleur-de-lis form. We find the same principle of the re-echoing of architectural detail, and its adaptation to iron-work in later time, as in this bit of the altar-rail at St. Thomas’s church at Salisbury, where we get the form of the Elizabethan gable and volute cresting the principal standards, which below are treated as pilasters of open work. Even in the extremely free and fantastic iron-work, like that of the porch-gates of St. Lawrence at Nuremberg, we may still see an acknowledgment of certain architectural and structural lines and limits. Or where, as in the free and flowing scroll of a hand-rail from a church at Rothenburg (for a sketch of which I am indebted to Mr. Spiers), it seems to escape from all structural trammels, we yet feel that the curves are designed with a view to fill the panel with an evenly dispersed grill of curves, and in strict though not formal relation to the square of the enclosing rails.

Not less instructive for the evidence they give of architectural influence are Medieval brasses in the treatment of the figure, the enclosing borders, and the use of inscriptions. More especially remarkable in design and draughtsmanship are the Flemish brasses of the Gothic period, where the full-length portraits of the personage or personages commemorated occupy the principal space in the panel, not cut out in silhouette and inlaid on the stone slab, as generally is English brasses, but relieved upon a rich diapered background. The ecclesiastical ones are often richly canopied, the borders full of smaller subjects, and resemble in arrangement the typical stained glass canopied window of the fourteenth and fifteenth centuries. The broad vertical and simple treatment of the draperies is very marked, and the character drawing is often very fine. With the attempts to gain more surface qualities, with the use of greater complexity of shading lines, when, in short, what is commonly called the pictorial element comes in with a desire to escape from the architectural

influence, design, ornamental effect, and draughtsmanship all decline.

It is the same in other branches of design, such as stained glass, which at its best shows such close relationship to the architecture of the building it enriches. With the evolution of the window from the small round-headed loop-holes of the Byzantine, through the simple lancet-pointed lights separated by solid masonry, to the foliated tracery and subdivided mullions of the later Gothic, the splendour of mosaic gave way to the splendour of the stained-glass window—at first a jewelled web of geometric lead thrown across the light; the form of the simple or cusped points of the tracery influencing the lead lines they enclosed, and the long vertical lines in the figures of saint and angel re-echoing the long lines of the narrow pointed light, into which ascended later the pinnacles of the canopies. Up to the end of the fifteenth century each light was still generally regarded as a separate panel, but with the large windows subdivided with light tracery and thin mullions, it became feasible to consider the design as filling the whole window.

The next step was to consider it as a transparent picture, to represent architectural perspective, which in this direction was a form of architectural influence distinctly injurious to the beauty of glass.

We may imagine that the stained-glass window represents a thin, flat, transparent screen (however varied by quality of colour), continuing the wall in another material, and thus preserving the idea of shelter and seclusion we always want in a building. Anything which interferes with this feeling, or contradicts it in design, which shows an effort to escape from the necessary conditions of the material leads one astray.

A kindred feeling determines the treatment of the wall, and perhaps nowhere is the necessary architectural influence more felt than in mural decoration. Anything which disturbs the general flatness and repose is out of keeping. We may gain a certain accidental or naturalistic interest, but at the cost of decorative repose and richness.

The Italian fresco painters of the Early Renaissance, from Giotto and his school onwards, thoroughly understood this, and though in details naturalism was carried quite far, as in the beautiful frescoes in the Riccardi Chapel at Florence by Benozzo Gozzoli, in spite of all their richness and variety, they remain essentially wall paintings, as completely mural as the finest arras tapestry, such as those splendid Burgundian specimens at South Kensington, which, while absorbing much of the new splendour and detail of the early Renaissance, remain Gothic in spirit.

The great principle in the design of these tapestries, as of early wall painting, was the exclusion of sky-spaces and atmospheric planes which necessarily, in proportion to the illusive design with which they are represented, must throw the wall out of the perpendicular. There is an instance at South Kensington of a sky and distance having been introduced into a fifteenth-century tapestry at a later date which quite ruins the effect.

We do not want to think we are out of doors while in a room, so that all successful mural decoration never forgets the wall—it acknowledges, in short, the architectural influence.

The same principle is to be traced in other textile design, in the geometrically planned and heretically treated silk hangings of Sicily, and the Venetian and Genoese velvets and brocades, with motives derived from Eastern sources, which would fall naturally into the lines of the buildings they decorated, and which frequently repeat the geometric foliated forms of Arabic and Gothic architecture, as in the brocade from a picture of Memling's. We see the value they are to painters and designers in affording rich backgrounds of definite recurring masses of pattern, to oppose the varied outline and relief of their figures.

There remains still vast provinces in design we have not been able to traverse in our search for the architectural influence which, in times of living artistic traditions, closely associated arts and crafts, and an organic architectural style (springing, as it were, from the very soil of the country), was paramount throughout art. Furniture and woodwork one, might say, has an architecture of its own, pressing into its service painting, carving, and metal work, and has often been part of the building itself. In detail and enrichment furniture constantly re-echoes the detail and enrichment of the prevailing architectural style of its period, from the graceful lines of the classical couch, chair, and lamp standard, which have reappeared in our own century, to the massive and simple oaken bench and trestle table of Mediaeval times,

or the richly carved and canopied seat. The arabesque panelled pilaster and classical cornice enrich Italian cabinets and cofferers; the turned chair or table leg of the seventeenth century onwards, constantly repeats in varying proportions the features of the quasi-classical column; the broken pediment surmounts the Chippendale book-case, while Greek refinement of line and feeling for delicate carved surfaces reappears in English chair-backs of the same period—and excesses of the later French Renaissance break out in the curly legs and dissipated scroll-work of, I regret to say, the current trade-furniture.

Historic costume, too, has the strictest relation to architectural style, from the simple and constantly varied folds of classical tunic and toga, the hood and peaked head-gear, and heavy vertical folds and figured stuffs of Mediaeval times; from the periwig and long-skirted coat, to our own day, when, "in spite of all temptations," the chimney-pot hat remains in strict architectural relation to the chief architectural feature of our cities.

In jewellery, metal work, pottery, inlaid; in the spacing of the book cover, the distribution of its tooling; in the arrangement of the book page and its decoration; in the form of choice type—everywhere in beautiful art, we may find the architectural influence, that poetry of the constructive sense which is the common sense of art, and adapts itself to all manner of useful things, giving to each its particular and ornamental value, and insuring it harmonious place and relationship in the great household of design.

I believe that in any period or country where exists anything like a distinct and living architectural style we shall find its influences coming out in all sorts of ways, harmonising and controlling invention, and bringing all the arts of design—which really owe their existence to architecture—into relation with itself. In countries like Japan, which (perhaps owing to its liability to constant earthquakes) have no stable or noble monumental type of architecture, it is noticeable, in spite of extraordinary artistic skill, there is a tendency towards triviality in the design of accessories: but even here it is noticeable how the form of their main constructive material—the bamboo—constantly reappears as an element in design.

It is curious to trace the lingering traces of architectural relation still clinging about such unrelated art, as much modern sculpture (or statuary) and easel painting—I mean in the pedestal as essential to the one as the frame moulding is to the other. Both sculpture and painting have set up a supposed independent existence—have gained, perhaps, a decree of judicial separation from architecture, if not a *decree nisi*. But it has only been for the sake of convenience and to meet certain commercial conditions; and thereby it becomes a grave question with artists—with all who care for beauty and harmony in art and life how far a unified art is possible under the rule of the huckster and the speculator.

It is certain in any case we shall never be able to build up a noble style in architecture and bring about a harmonious unity in all the arts of design without sympathy and co-operation, without some mutual understanding of each other's work and aims on the part of artists, whether their work is constructive or graphic, but I think of late years there are not wanting signs of a strong and growing feeling in this direction, which is beginning to tell upon contemporary work.

Mr. H. H. Statham said he had much pleasure in proposing a vote of thanks for the thoughtful paper which Mr. Crane had read that evening. The main idea running through it, that architecture had influenced all the best design, was, he thought, to be traced as true in almost every style of architectural ornament and detail. Only on the preceding Monday Professor Baldwin Brown, in that room, had objected, and he thought, rightly so, to the idea that the strips of stone-work in Saxon buildings were reminiscences of wood construction. The Professor denied that, and he agreed with him; but what was the result? It was only that it was the reminiscence of a still older construction. It was only a reminiscence of the Greek construction frittered down through Roman, and finally reappearing as a bit of decoration on the Saxon buildings. He remembered writing some bitter things about modern jewellery designing, and about the way in which fox's heads, horse-shoes, and other things were imitated. This made some of the jewellers bitterly angry, and one of them asked, what business an architect

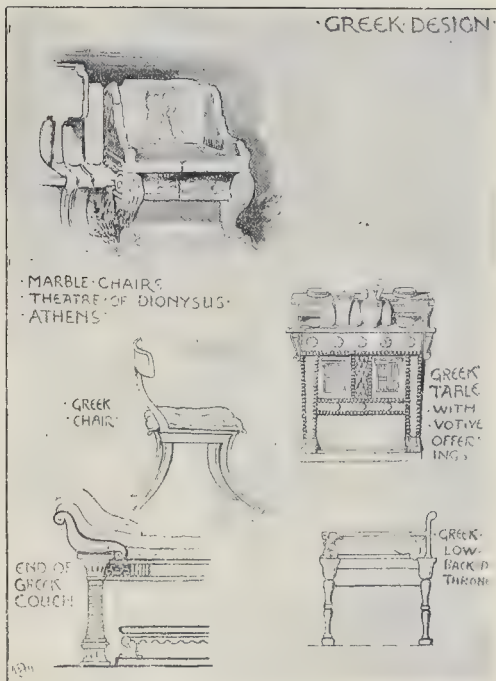
had to talk about jewellery. But architectural design was at the bottom of all really good jewellery design, and many of the finest jewellery designers of the Renaissance were also architects. On the other hand, it was not the business of design on a small scale to begin in any way to mimic architectural detail—ceremonial silver keys for the opening of buildings, modelled in the form of Corinthian columns for instance: he was sure that Mr. Crane would agree with him that this was a misconception of architectural detail. There were two or three points in the paper which he did not quite agree with, and which he would like to refer to. He did not think they could push too far the idea that the early spiral ornaments were derived from constructive expedients, and it was not necessary to seek that idea. It should be remembered that the idea of rhythmical repetition was inherent in the human mind. If they went to the origin of music, it would be found that it meant the repetition of notes in equal time, and it was natural that in primitive days people should take pleasure in the repetition of a curve perhaps traced in equal spaces. However, there was no need to go to the imitation of rope garlands and other applications to account for that. Mr. Crane had referred to the Norman chevron, but he did not suggest any practical derivation of that. He believed the zigzag arose from the desire for play and diversity of line. Then with such forms as the egg-and-tongue ornament came repetition combined with alternation. He did not like the classification of architecture into "lintel," "round," and "pointed" styles; it was at variance with the recent theories as to arcuated architecture. We had come to see that the distinction between the round and pointed arch was much less essential than it used to be thought. Pointed and round arches were found in the same building, the pointed arch being a constructive necessity, and the difference between Roman and Gothic architecture depended more upon general taste in detail, and a good many other things which were difficult to summarise, than on the mere fact that the arch was pointed in one case and rounded in another. Another point was the treatment of stained glass in relation to tracery design. He confessed that he had a strong feeling in favour of making the mullions the division of the glass design. When they came to windows where there was light and thin tracery, he did not like to see a stained-glass design forced, as it were, behind the mullions. In that case they were beginning to lose hold of the proper subordination of the design to architecture. The designing of a window, so as to divide itself up into the spaces left by the stone-work, was a very wholesome restraint and discipline for the stained-glass designer, and a better result was produced when the glass was made so that it appeared as if designed to fit each opening. One word with regard to the Sistine chapel. He agreed with what Mr. Crane had said about this: he did not see how they could well take a barrel-roof, and begin to design a great system of ornamentation, without making a sort of architectural division. He did not see how Michelangelo was to do otherwise than he did. He might have used his mouldings so as not to be illusory, but he was bound to paint some kind of architectural division. But in the case of a semi-circular dome, the true way to treat its surface was not to divide it vertically. He thought that was the mistake in Thornhill's paintings at St. Paul's. Thornhill had divided the dome up with a series of painted pilasters, which were not suggested by the domical construction, and a better effect would have been produced by treating such a dome as a surface undivided. It was not like a barrel vault, where they could begin at one end and go on to the other, but it was a thing like eternity—infinite—and there was no reason to make stopping-places in the design. He would like to see a design of a dome made in that way by filling in the whole with one design and not dividing it at all. He was somewhat amused at Mr. Crane's remark with regard to the mosaics in St. Paul's to the effect that that church ought to be a Byzantine building. It might be remembered that was exactly what Mr. Burges wanted to make it in his scheme, which was entirely foreign to Wren's architecture. In regard to the sketch which had been made on the blackboard by Mr. Crane, he agreed with the principle suggested, that, where there was an architectural border-line, and like that, the figure should be kept within it, and be subordinated to it. At the same time, he did not like to hear sculpture and painting spoken of as entirely dependent on architecture. He considered that the easel picture had a mission of its own. It could have a poetic freedom which

GOTHIC DESIGN.



CARVED BENCH ENDS
DORRINGTON CHURCH
SURREY.

GREEK DESIGN.



MARBLE CHAIRS
THEATRE OF DIONYSUS
ATHENS.

GREEK
CHAIR

GREEK
TABLE
WITH
VOTIVE
OFFER-
ING.

END OF
GREEK
COUCH

GREEK
LOW
BACK
THRONE

1895

was not allowed to the work of the wall-painter and sculptor, and have a meaning such as it could not aspire to if made part of architecture. If they took, for example, Mercie's "Gloria Victis," which stood in one of the courtyards of the Paris Hôtel de Ville, it would be found that the architecture formed an effective background for it, but it was too full of pathos to bear to be treated merely as an architectural accessory. Let them, therefore, give all due importance to the subordination of sculpture and painting, when used decoratively, but, at the same time, leave them their own path apart from decorative work.

Mr. R. Phéné Spiers seconded the vote of thanks. He said that about the year 1873, the late Mr. William Burges was called upon to decorate St. Paul's Cathedral, and just ten years before that he remembered his saying that the only thing to do with St. Paul's would be to cut off the whole of the mouldings and plasters, and cover it over with gold mosaic. He (the speaker) was shocked at the idea, but judging by what was to be seen in St. Mark's and in Santa Sophia, it would no doubt be decoratively the best, though one might not like to see it carried out in St. Paul's. In the design of 1873 Mr. Burges found it impossible to carry out such a scheme, and he proposed only to cover the upper portion of the building, that which was now covered with plaster, with mosaic, but he supposed that Mr. Burges found, in the course of making his designs, that it was impossible to get the colour of the mosaic to accord with the cold colour below. In Byzantine structures the lower parts of the walls were covered with marble, and Mr. Burges saw another alternative, which was that the whole of the surface inside the pilasters should be cut to a depth of 3 in., so as to have a veneer of marble. He did not know whether it was that which caused the upsetting of the design, or whether it was the design of the Saints which he proposed for the decoration of the mosaics. He was afraid it was the latter, although Mr. Burges had perhaps the greatest knowledge of iconography of the time, and was careful only to put in Protestant saints. However that might be, the whole thing fell through. He agreed with Mr. Statham as to the treatment of the dome. The only difficult thing was to understand what should be the decoration, though when the subject was taken up some time ago he came to the conclusion that the design of Alfred Stevens was the best. At the time there were those who insisted that the vertical lines suggested by Sir James Thornhill, should be retained, and there were those on the other side who

maintained that there should be a series of horizontal lines. From the drawings, however, he came to the conclusion that the method suggested by Mr. Stevens, in which there were a number of large circles and smaller ones with ornament between would be the best on the whole. Mr. Crane would look at them sometimes as decorative forms. He agreed with the lecturer, to a certain extent, as to the plaited work, which, no doubt, had a great deal of influence on the origin of forms, and the early square pattern in Egyptian work could be traced back to the plaited decoration. Mr. Crane had also spoken of the Egyptian Temple, but he did not seem to have suggested the origin of the Cavetto moulding. M. Viollet-le-Duc had endeavoured to give a description of it, and the subject had been treated by various antiquaries, although he believed that all had more or less failed, the first person who had given a reasonable definition of it being Mr. Finders Petrie. All throughout this country were to be found beautiful specimens of the sculpture of the Gothic period, quite sufficient to show that the English sculptor was equal to the foreign one, although there might not be the same number of statues. The figures in the Lady Chapel at Ely were of the greatest beauty, and it would be impossible to find throughout France any more refined examples, while the same might be said of those on the south porch of Lincoln, showing that the English artists were quite equal to those of foreign lands. The responsibilities of architects became serious when they considered the influence architecture had on dress. He did not know whether Mr. Crane would suggest that the dress of the ladies of modern times was due to architectural influence, but it laid a greater responsibility on architects than he had before thought of. Mr. Crane's system of brown paper diagrams was one of the best methods they could have. It was very effective, and it would be well worth while to

endeavour to get the same value in a simpler way than if the whole thing was worked up from the white paper.

Mr. A. B. Pite remarked that it took a very great man to generalise on such a vast subject as they had had brought before them in so comparatively simple a manner that evening. To take a general survey of the whole artistic development of civilisation, in the way Mr. Crane had done, argued a width of view and a power of analysis and criticism which he was afraid was seldom found in these days. The interest of these studies was very vast, there was something entertaining and exhilarating in tracking back a common form of every-day art and use to its prehistoric origin. He rather wished to suggest the question of whether, after all, it was not more useful to work as artists, designers, and originators of artistic form, to consider the ornamental continuity of detail rather than its archaeological and antiquarian relations. People adopted the whole results of the architectural history of the world as so much trimming and cloth and paint, wherewith to decorate and clothe their buildings, and the style of cut and fashion was taken up to suit the passing fad of the hour, and in consequence it was almost impossible to imagine an architect now producing a fine monumental design. There had been an opportunity given of erecting a monument to, perhaps, one of the greatest geniuses of the art history of the nineteenth century. He referred to the late Prince Consort, who was a man of breadth of view and had great influence upon the art-life of the country. They had had the opportunity of raising a monument to commemorate such a character and influence in their midst, but had fallen back upon really the most frivolous type of monument. They had expended their wealth and energy on beautiful form, colour, and sculpture, but the result was trivial to the last degree. Everything was unmonumental, everything was unimpressive, overdone, over-elaborated and attenuated. It was very easy to say that sort of thing, and to express an adverse opinion, but it was difficult to concentrate one's mind upon anything which could take its place. They could not rush to the opposite extreme, and erect a great pyramid, and it was difficult to conceive what else could be done, acting, as they must act, within the limits of their own experience, and using the materials they had at hand and the architectural forms with which they were supplied. Of course, the public might ask why a hospital had not been erected, or some college endowed, but

that was outside the mark, and was no answer to the difficulty. He had ventured to express a hope some time back, and he would again repeat it, that the Institute in their zeal for architectural knowledge and examination, might introduce the subject of ornamental analysis and history into their examination programme, instead of requiring the abominably stale repetition of architectural forms without any relation to their meaning, or any adequate idea of their use. Nothing could be worse than the effect of taking a vast library of architectural pictures, and learning the forms, in order to be able to reproduce a few of them in an examination. This must do a great deal of harm to the student's habits of thought, let him rather study the underlying principles of ornamental development, and how, by the concentration of ornament and the flow of lines, effect was produced. He should also bestow a little attention on the way in which artistic effect was arrived at, apart from what they had been in the habit of calling style. With regard to the matters which had been discussed by Mr. Statham and Mr. Spiers, he could not help feeling that Mr. Statham's idea with regard to the decoration of the dome suggested a difficulty. Mr. Statham's idea was that the dome should be undivided—that its spherical form carried an imitation of the sphere of heaven, which had no architectural subdivision. How then was the dome to be decorated? Was decoration possible apart from architectural form? He would be glad to have an expression from Mr. Crane on that point. It was not at all trivial to refer to dress as being related to architecture. He thought it was the late Professor Semper who traced all architectural origin to dress, and when one remembered that the first object of dress was comfort and utility, the purpose was practically the same as that which existed between the house, the walls, and the roof, to which they added ornament, and this all derived its purpose and proportion from the necessities of the building.

Mr. Hooper said he did not wish to take any part in the discussion, but he wished to ask if Mr. Crane would allow the admirable illustrations to his paper to be exhibited on a future occasion. In fact, he would like to see them exhibited at the next conversation.

The Chairman, in putting the resolution, said they would all agree that the paper had been an admirable one, while, as Mr. Hooper, had stated, the illustrations on the screen were most excellent examples. There was only one thing he had to say, and that arose out of the title of the paper. Did Mr. Crane suppose that architecture at the present moment was guiding all the other arts, in the extraordinary craze for originality, or was architecture simply doing what was more or less in the air all round?

The vote of thanks was then put and very cordially received.

Mr. Crane, in reply, said that he was much gratified that the paper had caused so much interest, as one who was not an architect approached such a subject in a society like that with some timidity. In reply to Mr. Hooper's request, he might say that he would be most happy to place every facility in his way for exhibiting the drawings. He was strongly inclined to be drawn towards the constructive origin of the graphic arts so far as they touched design. So soon as they began to rely upon paper entirely for design, they lost the grip and grasp of constructive design, not to say architecture, and got into a tame kind of repetition without vitality. With regard to the question of stained glass, he personally considered that the most satisfactory system was to make the design of each light complete in itself. He was sometimes supposed to sneer at easel-painting, but was he likely to do that, as it was part of his own work? It was supposed, because he ventured to put in a plea for the craftsman and constructive designer, that he must necessarily flout the easel painter. He did nothing of the sort; he only had a general conception of what art should be at its best and noblest, and that was when all the arts were united in noble architecture. Mr. Spiers had made some interesting remarks about Egyptian architecture, and had also mentioned St. Paul's and Mr. Burgess. It was too late to say much about St. Paul's, but while he would prefer to leave it alone, if it must be decorated, he would be inclined to gild the whole of the dome, and hang the rest of the church with rich hangings and framed pictures (Mr. Statham: "Easel pictures?") They would have to be large and well done. He meant panels in frames, hung on the walls. He thought that was a reasonable way to treat a church of such a type. He was told that Sir Christopher Wren never contemplated St. Paul's

being painted or decorated in any highly ornate way, but that he wished to give the full value of light and shade to his building, and where there were no mouldings existing previously, he did not think the decorator was called upon to introduce them. That, however, was a question of motive and scheme, and it did not alter his original view that these were some of the difficulties with which they were opposed when they began to call in modern artists to decorate a building of past times. Mr. Pite had made a most interesting speech, and he was glad to have his sympathy in the general view he took. It was gratifying to hear that Mr. Pite considered the suggestion of studying ornament from the point of view he had put forward as a good one in connexion with the work of the student. In connexion with ecclesiastical dress, which must have always been considered in relation to architecture, it would be found that there was a distinct correspondence of style both in mass and detail—for instance in the front of the cope with its embroidery. The Chairman had asked him the tremendous question whether he would apply his principles to the present, and assert that the arts were now, in these days of general dissipation, distinguished by the influence of architectural style. Mr. Mountford had said that everyone was aiming at being original at whatever cost, and that no doubt was true. He thought that the architectural initiative, which he had traced in past ages as being prevalent, had disappeared in the present time. Separation of the arts, which he deplored very much, had taken place, and each was free to work, so to speak, "upon his own hook." It did so, no doubt, to its own damage, and to the detriment of the other arts, and there was a tendency at different periods for one art to attempt to dominate over another. In the present day he would say that architecture was not the dominating influence, but rather the graphic art. He thought, however, there were signs of a return to a more sound and sensible state of things, and he considered that many artists were now deeply interested in architecture, and joining interests with that art, in trying to build up something like what he should call a style. No style was worthy of the name which did not come straight out of their lives.

The proceedings then terminated.

PETERBOROUGH CATHEDRAL RESTORATION.

At a meeting of the Committee, held on the 28th May, at which the Dean presided, the following report from the Architect (Mr. J. L. Pearson, R.A.) was read:—

"DEAR MR. DEAN,—I am deeply distressed, in common I am sure with everyone interested in the Cathedral, at the effect of the storm upon the upper part of the west front; but after a careful survey, I must say that I am thankful that more mischief was not done considering the sad state the masonry has got into. It seems indeed surprising how some of it resisted so terrible a visitation, for not only is the stone in numberless prominent places very much decayed, but the mortar in the beds and joints has come out to a considerable depth, and for some iron cramps—also much decayed—the tops of all the pinnacles would in all probability have been thrown down. There can be little doubt that much injury has been done in very severe winters through the alternate changes of rain, snow, and frost playing into the open joints. Some of the masonry too has suffered in consequence of this, and much more would it have suffered but for the enduring quality of the stone of which the Cathedral is built.

The time has now arrived when some general repairs must be undertaken, extending over the whole of the western portion of the Cathedral. It is absolutely necessary that its various features should be preserved, and, unless these repairs are done at once, I am sure that ere long a much greater work will have to be faced. The features which have been thrown down must of course be rebuilt, using up all the old stones as far as possible.

As regards the west front itself, what I have said with reference to the pinnacles and the work in connexion with them applies equally to this. The masonry over the whole of it, especially in the space above the three arches, has suffered, and is suffering from neglect and the want of timely repairs, but to what extent I cannot say until a scaffolding has been erected. This scaffolding I would venture to urge the Dean and Chapter to allow me to put up as soon as possible. It is obvious to every observer that the centre part between the flanking towers bends considerably outwards; careful plumbing has determined that the detached clustered columns with the part up to the stringcourse above them lean outwards to the extent of fully two feet, and that the three gable-ends have an inclination in the same direction of about 6 in. Upon looking for the effect of such a divergence from the perpendicular of these

pillars and arches upon the work inside the arcade, one is surprised to see how little there is to indicate that such a great movement has taken place, for instead of huge gaps in the groining which one would have expected to see, there are only—so far as can be discerned from the ground—some slight openings in the cells. Coupling this fact with the fact that the three gables lean over at a less angle than the pillars below them, and that some of the work in connexion with these gables inside the roof is nearly perpendicular, I am very much disposed to think that the pillars began to settle and to lean outwards at a very early period, even perhaps before the gables were erected, and certainly before the groining of the arcade was put in. It must have been at some early period that the four great ties were introduced which pass through the wall for the purpose of hanging on the west front to the square towers behind; these ties are still in a perfect state, and show clearly that since their introduction little or no further movement has taken place. These towers have gone over a little to the west, but whether it is partly in consequence of having the weight of the west front upon them I am not prepared to say. In addition to these ties there are three others which come over the centre of the arches and are connected to continuous horizontal beams which lie inside the gable walls, and are, opposite to each gable, cleverly framed together like a trussed beam; they also add material support to the walls. The centre gable is, however, not so well supported as the two side ones, because it has not a direct hold on to the towers. I would, therefore, advise that a strong girder be introduced, stretching across the space between the two towers and built into and strutted from them to which two or three ties similar to the existing ones could be attached, thus the centre part of the west end would be effectually secured. I would also advise the introduction of a strong iron tie bar some little distance above the caps of the pillars to connect them with the wall and for the purpose of preventing any further movement westward, additional help in this direction would be gained by the removal of some 2 ft. of the filling in over the groining, for the weight of this needless mass of masonry induces a lateral thrust decidedly injurious to the pillars.

As regards cost, I can give you no particulars at present, and not until the work to be done has been fully estimated and considered in detail, to that part of the work which is above the roofs and can be got at can be estimated without much difficulty, and I hope ere long to be able to furnish you with the particulars.

Believe me, yours faithfully,

JOHN L. PEARSON."

In a subsequent letter to the Dean, Mr. Pearson states:—

"I should like to emphasise what I said as to the unsatisfactory condition of this front, and the necessity for immediate steps being taken for its preservation. I do not refer merely to the fact that the two main piers of this front lean over 2 ft. and 2 ft. 2 in. respectively in a height of 78 ft., but to the insecurity which is manifest in so many places, for instance—the stones forming one of the rings of the northernmost arch are much out of place, the other rings over it are twisted and fractured, and the quadrifoliate opening above is greatly distorted, and any further movement here, however slight, might lead to deplorable results. The corresponding portion of the southernmost arch also manifests a similar defect, but to a somewhat less extent. It would be a wise precaution against accidents to fence off the northernmost archway until it has been properly examined, and the arch and the work in connexion with it have been made secure."

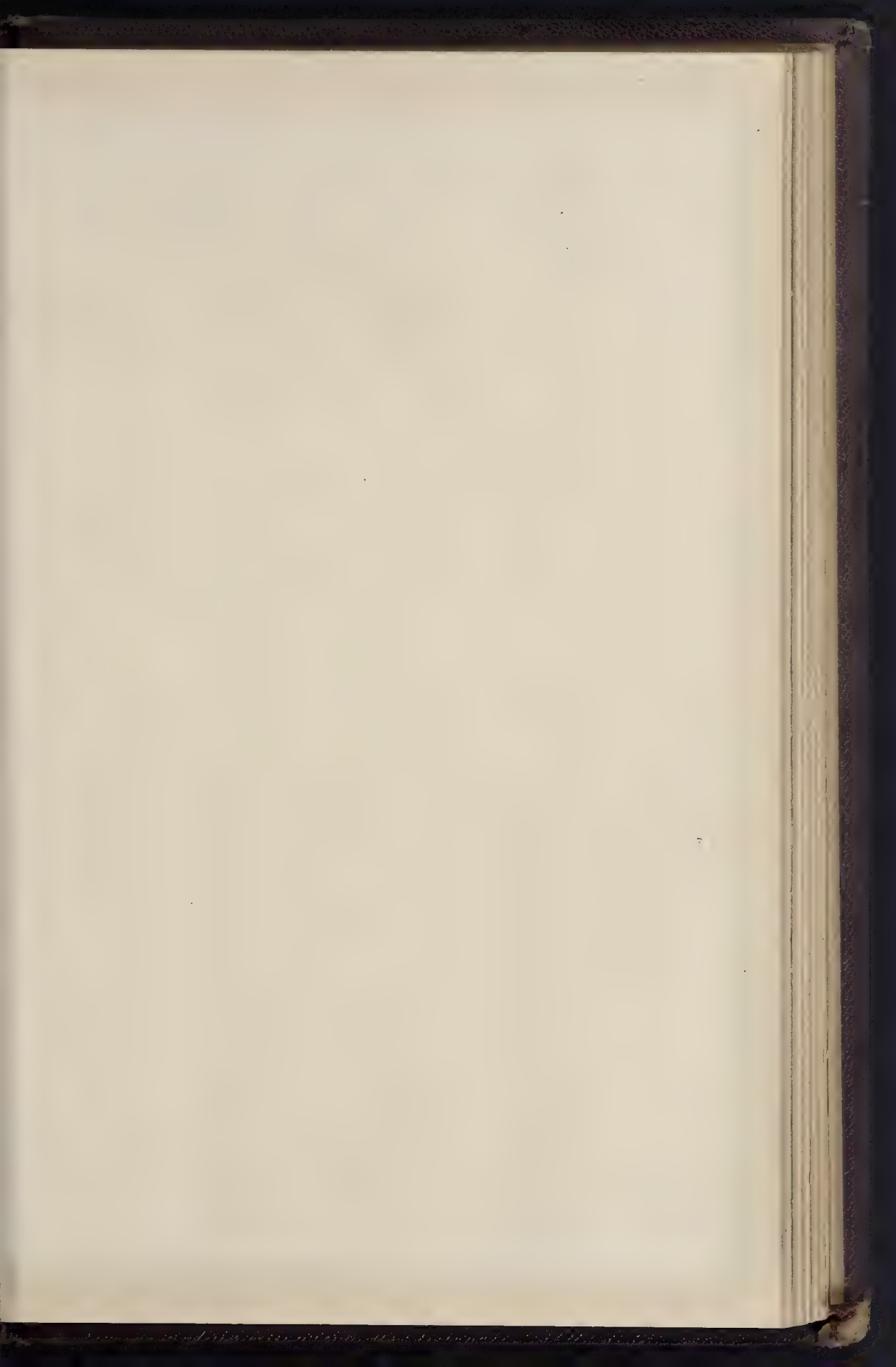
The Restoration Committee unanimously resolved that the Sub-Committee be requested to prepare an appeal—

- (1) For the amount required for the repair of the pinnacles and spires on the towers of the west front.
- (2) For such an amount as, after conference with the architect and builder, may be thought probably sufficient to secure the safety of the remaining portions of the west front.
- (3) For the amount still required to complete the repairs to the transepts and eastern chapel.

RECENT WORK AT TECHNICAL INSTITUTIONS.

WHEN the social history of the latter part of the nineteenth century comes to be written, it will be mixed up largely with the spread of technical education, and the foundation, as far as London is concerned, of the technical institutions which have sprung up around the metropolis. Two exhibitions are now on view which show the results accomplished by two bodies, the one in a teaching, the other in an examining capacity. We refer to the exhibition of students' works just held at the City and Guilds of London Institute and the Battersea Polytechnic.

Taking the latter first, as one of the teaching institutions, we are curious to note what kind of work is being accomplished by these new organi-



LINDISFARNE PRIORY

HOLY ISLAND

PLAN OF THE REMAINS OF THE BUILDINGS EXPOSED DURING THE EXCAVATIONS MADE WITH THE PERMISSION OF THE COMMISSIONERS OF WOODS AND FORESTS BY MAJOR GENERAL SIR WILLIAM CROSSMAN K.C.M.C., M.P. IN 1887 '88 & '89.

SCALE 8 FEET TO ONE INCH




LEVELS

THE DATUM IS THE SURFACE OF THE STONE COVERING THE DRAIN MARKED A. THE FIGURES IN BULLETS ARE THE LEVELS IN FEET AND DECIMALS OF FEET. THOSE ABOVE DATUM ARE MARKED + THOSE BELOW DATUM ARE MARKED -

SURVEYED IN DEC. 1889 BY MAJOR GENERAL SIR WILLIAM CROSSMAN K.C.M.C., M.P. AND C. C. HODGES ARCHITECT. DRAWN IN JAN. 1890 BY Charles C. Hodges

PHOTO LITHO GRAPHED BY H. & J. EAST HARDING STREET FETTER LANE E.C.

stations. In this respect we notice much that is of merit, and which fully justifies their existence. In the Bricklayers' Room, beyond the practical requirements of bonding, features in cut brick-work for different positions and forms are carried out with considerable skill, and although there is always a tendency for teachers to encourage their students to execute difficult pieces of construction without reference either to beauty or fitness, yet a commendable endeavour seems to be given to make the pupil take an intelligent interest in his work. One good point, which we cannot too often insist on, is that the practical work is always executed from a working drawing made in the shops by the students themselves.

In the Carpenter and Joinery Room, which is excellently fitted with the electric light and modern improvements in regard to benches, creditable work is shown in plain mortice-and-tenon work, and all the simpler form of jointing to doors, windows, and the like; and the same remarks apply to the plumbers' and smiths' shops.

One of the most interesting features in the building is the mechanical laboratory, which seems unique of its kind, as far as London is concerned. The room is fitted up in an ideal way for its purpose. Every force or strain is shown in action by a series of working models, arranged round the walls and in the centre of the room, so that the student can actually experiment for himself—a matter of importance, enabling him to grasp what is meant much better than by means of illustrations in a text-book.

In the Painting and Decorating class, a start seems to have been made which may bear better fruit next year. In connexion with other work, such as dressmaking, millinery, &c., which do not come within our domain, good work is shown, and one sees at once what great influence these institutions will have in forming better taste among the mass of the people.

As we are informed there are some 4,000 students on the books, the use of the Polytechnic seems fully justified, and one cannot help wondering how the people, both men and women, formerly passed their time.

The other exhibition to which we referred, that of the City and Guilds of London Institute, at the Imperial Institute, bears a more national stamp, for herein are collected the works of students sent up for examination from all parts of the country, in competition for the certificates and prizes issued by the Institute. In the carpentry and joinery section, we pass at once from the works of the beginner, as seen at Battersea to those of the working carpenter of a high grade. Here, as before, each work is accompanied by a working drawing made by the craftsman. Among the models, we notice especially those for gables, centring for arches, handrailing staircases of all kinds, including circular ones, showing the working method of obtaining face moulds, &c., circular work in doors and windows, wooden vaults, circular and elliptical, and methods for finding the ribs, &c., roofs of all kinds, and their jointing, including some rather elaborate examples in domical roofing, examples of different kind of shoring.

In more advanced work still we notice a model of the interior of a room, showing it finished with panelling, an attempt at original treatment which should be encouraged. In a rather elaborate model of a pulpit in wood we notice commendable patience and skill in execution, expended, however, on a design which is not worthy of it. This is a point which we have before touched upon, but we cannot too often insist that we have rarely arrived at a period when good form and details should go hand-in-hand with good workmanship. We think there is a tendency in this direction, as the sections of the mouldings seem more carefully studied and have less of the stock pattern about them than in former years.

In the other subjects, such as cabinet-making and ship-joinery, examples of clock-cases, lanterns and hatchways are shown; while in plumbing, boiler-making and riveting, turning, pattern-making, machine-designing, &c., much creditable work is sent from all parts of the country; the exhibition is a gratifying one, as showing the excellent work the Institute is encouraging throughout the country.

THE INSTITUTE OF ARCHITECTS AND ITS ASSOCIATES.

A MEETING of Associates of the Royal Institute of British Architects was held on the 17th ult. at Dr. Williams' Library, Gordon-square, W.C., for the purpose of considering (1) the replies received from candidates for the R.I.B.A. Council to the following letter, and (2)

the desirability of electing a permanent Associates' Committee. The letter, which was signed by seventy-four London and provincial Associates, was as follows:—

"We, the undersigned Associates, are anxious to obtain your views upon the question of the qualification for the Fellowship of the Institute, and we should, therefore, take it as a great favour if you would be so kind as to forward a brief reply to the following question to Mr. H. V. Lanchester, 12, Great James-street, W.C. . . .

1. Are you in favour of restricting the Fellowship of the R.I.B.A. to
 1. Associates;
 2. Other architects who were in practice before 1880; and
 3. Those whose work is of exceptional merit?
4. In the case of the latter, would you advocate that photographs of their executed work should be exhibited at the Institute Rooms for one month before the election?"

Mr. Owen Fleming having been called upon to take the chair, said that there had recently been a good deal of discussion in London and the provinces as to the qualification for Fellowship at the Institute, and as to the elections. The methods of election which had been tried hitherto had led to some unfortunate results, which everyone regretted, and it therefore seemed very desirable that some general principles should be formulated, governing the qualification for the Fellowship. With this object in view, certain questions had been submitted to candidates for the forthcoming Council election, so as to ascertain their views upon the subject. Many answers to those questions had been received, and he thought that they should consider whether or not the present position of affairs was satisfactory; and if not, whether any steps should be taken to improve matters. He desired to call upon Mr. Lanchester, who had undertaken the secretarial work, to read the replies which had been received to the circular letter.

Mr. Lanchester then read several letters from candidates for the Institute Council. Mr. Ernest George replied that he was against restricting Fellowship to Associates, and his reply to questions 3 and 4 was "Yes." Question 2 was unanswered. Mr. Aston Webb replied that he was in favour of restricting Fellowship to Associates and those who had done really good work. That, in his opinion, should be the main qualification of all for Fellowship. They should be known by their works. Mr. J. M. Brydon replied that he would not restrict any architect from becoming a candidate who could fulfil the requirements of the Charter, except for the quality of his executed work, and of that he thought the Council should be the judge, as at present. Mr. C. Hadfield, the President of the Sheffield Society of Architects, replied at some length, stating, however, that he did so as a private member, and not as President of his Society. His sympathies, he said, were with the objects aimed at in the circular, but he did not think that those objects went far enough. He had been a member of the Institute for many years, and was now losing all confidence in what it is likely to accomplish. He proceeded:—"Had I my time to come over again I should have been an outsider. I fully sympathise with the views of the memorialists; in fact, I was one of them. Architecture is not a profession, nor a business, but a constructive art. An architect who loves his craft, and desires to steer clear of the commercial element, which the R.I.B.A. people seem to be determined to force into the ranks of the Fellowship, cannot do otherwise. I am willing to sign clauses 1 and 3, but with the proviso that in addition to the candidate submitting photographs of his work, he should append plans, and some kind of endorsement from his local society that he is a *bona-fide* architect, and not a land surveyor or estate agent. Numbers of these men (very respectable in their way, I have no doubt) are doing lucrative architectural work in the provinces, and some, I believe, have been admitted as Fellows of the Institute, and further as members of the Society of Architects. This sort of thing will have to be reckoned with before long, and if the Institute, in spite of repeated warnings, will not recognise the existence of this evil, so much the worse for the Institute and its abettors." Mr. John Slater replied as follows:—"I see no objection to Clauses 1 and 3, but I could not support Clause 2 as, in my opinion, it would inflict great hardship on many provincial architects who have never been Associates of the Institute, but whose honourable conduct of their profession, and the general character of their works quite entitle them, in my

opinion, to the Fellowship. I should, however, not object to a clause to the effect that all candidates for the Fellowship who are not Associates must have been in practice at least twelve years. As to the exhibition of photographs of the executed works of candidates in the Institute rooms, I think this would be most improper, and I should strongly oppose it." Mr. Phene Spiers replied to question 1, that he was not in favour of any other restrictions as regards the Fellowship than those now prescribed in the by-laws. To questions 2 and 3 his reply was as follows:

"I consider that integrity in professional practice (the proper maintenance of which was the principal object sought to be obtained by those who founded the Institute in 1835) is of even more importance in a candidate for the Fellowship than exceptional merit of design. The R.I.B.A. is not a Royal Academy with limited membership, but a professional society, to which all honourable practitioners ought to belong. The only limitations to the Fellowship with which I should be inclined to agree would be—(a) integrity of practice; (b) sufficient evidence that the candidate is really the author of the works to which his name is attached as architect; (c) the execution of work of sufficient importance, either in artistic design in construction or in extent to warrant the application for the Fellowship, still retaining the seven years' limit. In explanation of the latter paragraph, I should say that an architect who has carried out works of great importance, such as hospitals, asylums, schools, or large warehouses, ought to be admitted, although the artistic design thereof, so far from being of exceptional merit, would, in my opinion, be simply damnable. I do not think that any architect of position could, with due self-respect, be induced to exhibit photographs of his work so as to lay his claim before the members generally, whether Fellows or Associates, some of the latter of whom might actually be clerks in his own office." Mr. Leonard Stokes replied that he is distinctly of opinion that a man's executed work is the one and only test that should be applied to a Fellow. Examinations on paper might be all very well, and a proper test for Associates, but in his opinion they are no good whatever for Fellows. The fact of an Associate having passed an examination brings him no nearer to the Fellowship as far as his architecture is concerned. It was not in favour of closing the Fellowship to all men who are not Associates, as he held that any man who can do really first-rate work should be eligible for election as a Fellow, quite apart from any time limit; but such a man should certainly be a good architect. Mr. Paul Waterhouse replied that the proposals indicated in the letter were nearly identical with a motion with which he was connected a year or two ago in the Council. His views were quite in accord with the general spirit of the questions asked. Mr. William Young, in his reply, said that he thought the qualification for Fellowship should be the exceptional merit of a man's work. That was the only way to make the Fellowship of any value. The suggestion to exhibit photographs of candidate's work was a good one. In exceptional cases, where a candidate's work was well-known, this might be dispensed with. Replies had been received from three Associate members. Mr. Atkin Berry replied that he was in favour of restricting the Fellowship to (1) Associates, and (2) other architects in practice before 1880, and from those whose work is of exceptional merit. In regard to the exhibition of photographs he thought there might be difficulties in making that a rule. He should prefer to see actual drawings by the candidates. Mr. Flower was in favour of restricting the Fellowship to (1) Associates (2), architects in practice before 1880, and (3), those whose work is of exceptional merit. He believed in the exhibition of photographs, but thought the number should be limited. Mr. F. T. W. Goldsmith's replies were all in the affirmative, but he added to the second:—"Provided the architect is in active practice." Mr. E. J. Dodgshun, of the Leeds and Yorkshire Architectural Society, replies were, "yes," to the first and third, and "no" to the second. He thought it might be desirable in some cases to exhibit photographs of executed work in the Institute rooms, but not in all. Mr. Caroe supported the view that a candidate for the Fellowship should be judged by the quality of his executed works.

Mr. Lanchester also stated that letters from 59 provincial and other Associates had been received, warmly supporting the proposals to limit the qualifications for Fellowship. Of these, 26 agreed to the limitations contained in the Circular, 26 proposed to only admit Associates, and other architects who had done exceptionally

good work, 6 desired Associateship to be compulsory, and 2 accepted proposition 3 only. As to the exhibition of photographs, there seemed to be a general opinion that such a course would be desirable.

Mr. Sutcliffe, of Manchester, in his reply, stated that he knew of a case where a gentleman failed in the examination and was afterwards elected as a Fellow.

In the discussion which followed the reading of these letters, Mr. Brodie and other gentlemen pointed out that it would be clearly too late to communicate the views of that meeting either to the candidates for the Royal Institute of British Architects' Council or the members who had received voting papers. The majority of voters had no doubt sent in their papers.

Mr. H. Hardwicke Langston moved that the information be not sent.

Mr. G. A. Pryce-Cuxson seconded, and the motion was agreed to.

Mr. Langston next moved that the first of the questions be put, as to restricting the Fellowship of the Institute to Associates.

After some discussion, during which a speaker pointed out that the question, as put, seemed to imply that Fellows should be elected from Associates to the exclusion of those who are not Associates,

Mr. Gill Knight suggested that the words of the third question should be added to the first, so that the motion would be as follows: "That this meeting declares itself in favour of restricting the Fellowship of the Royal Institute of British Architects to Associates, and to other architects whose work is of exceptional merit."

Mr. Langston accepted the suggestion, and questions one and three, as incorporated, were unanimously agreed to. The proposal to admit other architects who were in practice before 1880 met with little support, and was not pressed.

In regard to the question of exhibiting photographs of executed works of candidates for the Fellowship, Mr. Lanchester said that this proposal had arisen because it was felt that, when the names of candidates for election were submitted, it was often the case that the general body had no knowledge of the character of the works of the candidates, and considerable injustice and difficulty had arisen in consequence. In one case, in order to reject a candidate who was thought not worthy, several very suitable candidates were rejected, just because the members voting had no knowledge of the candidates' qualifications; surely some means like those proposed should be adopted, by which members voting should know what the candidates' qualifications were. Photographs could be easily procured, and it was thought that they would most suitably show the character of the candidates' works.

It was subsequently moved "that this meeting would suggest to the Council of the Royal Institute of British Architects the desirability of exhibiting, for one month before the election, photographs and working drawings of the executed works of all candidates for the Fellowship."

The motion having been seconded, an amendment was moved to the effect that a list of the executed works of the candidate be attached to his name in the nomination published in the Institute Journal.

The amendment, however, was lost, and the original motion having been put to the meeting met with the same fate.

The next business was the appointment of an Associates' Committee, and it was ultimately agreed to appoint a committee to carry out the views expressed at the meeting, and the names of the following gentlemen to serve on that committee were agreed to:—R. Shekleton Balfour, Sydney B. Beale, John Begg, Arthur J. Bolton, Owen Fleming, B. F. Fletcher, James S. Gibson, Sydney K. Greenslade, Francis Hooper, H. V. Lanchester, John Murray, J. E. Newberry, G. A. Pryce-Cuxson, J. Humphreys Jones, Andrew W. Prentice, Edgar H. Selby, F. W. Troup, Charles E. Bateman, Harold Brakspear.

On the motion of Mr. Langston, a hearty vote of thanks was carried to the Chairman for presiding, and to the Secretary for his trouble.

The meeting then terminated.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday, in the County Hall, Spring Gardens, Mr. Arthur Arnold, Chairman, presiding.

Insurance of Buildings used for Municipal Purposes.—The General Purposes Committee submitted a report on the subject of a Municipal insurance scheme, on which it was agreed that

the Committee should consider the scheme for the mutual insurance of buildings in London used for Municipal purposes.

The Works Committee.—The Bridges Committee stated that their attention had been drawn to the fact that by the present standing order the Works Committee had to report to the Council in April and October in each year the estimated and actual cost of the works which have been completed. On May 7 the Works Committee laid before the Council a list of works executed, including eight works estimated to cost 17,991*l.* 10*s.* 4*d.*, but which actually cost 19,112*l.* 9*s.* 1*d.*, and which, on their recommendation, the Council directed the Works Department to carry out. All those works have been carried out without their having been informed that they were completed, or that the cost was likely to exceed the estimates agreed to by the Works Department. The Committee recommended:—

"That the Works Committee be instructed to lay before the Bridges Committee the accounts for works which have been carried out by the Works Committee on behalf of the Bridges Committee as soon as possible after the completion of the works, and prior to their being presented to the Council, in order that the Bridges Committee may be in a position, should it so desire, to inform the Council of its views upon any matter arising thereon, at the same time as the Works Committee presents its report to the Council."

Mr. Strong, on behalf of the General Purposes Committee, moved the following amendment:—

"That, as the suggestion of the Bridges Committee concerns other committees on whose behalf works are carried out by the Works Committee, it be referred to the General Purposes Committee to consider and report whether a standing order should be made to effect the object in view."

The amendment was agreed to.

Erection of High Screens near Houses in Chesham gardens, Kensington.—The Building Act Committee brought up the following adjourned report:—

"We have proceeded upon the resolution of the Council of April 30 last, passed on the motion of Mr. C. H. Campbell, referring it to us 'to consider and report whether means should not be taken to procure such a change in the law as will effectually prevent the erection of such insanitary screens as were lately put up in the rear of certain houses in Chesham gardens, Kensington, and which the Council, to its regret, found itself unable to interfere with under the existing law.' Having given careful consideration to the suggestion contained in the resolution, it appears to us that the proposed change in the existing law would involve serious issues as raising the whole questions of law relative to the preservation of ancient lights, and would therefore require to be dealt with by means of a public Bill to be initiated and taken charge of by the Government. We are of opinion that it would be of no avail for the Council to move in the matter at any rate at present, and we recommend—"That the reference be discharged."

After an amendment to refer the matter back had been proposed and lost, the recommendation of the Committee was agreed to.

Proposed Street from Holborn to the Strand.—The consideration of the report on the proposed street from Holborn to the Strand was once more postponed.

New Lining Station at Barking Outfall.—The recommendation of the Main Drainage Committee was approved for the erection of a new lining station at Barking-outfall works. The rough estimate of the cost is 43,250*l.*

The Collection of House Refuse.—The Public Health and Housing Committee recommended:—(a) That application be made to the Local Government Board for its sanction to the Council proceeding against the Holborn District Board and the Lambeth Vestry, under section 30 of the Public Health (London) Act, 1891, for not securing the due removal at proper periods of house refuse from premises in their districts. (b) That, in the event of the sanction of the Local Government Board being obtained, the solicitor be instructed to take proceedings against these authorities under section 30 of the Act.

Alderman Hubbard moved an amendment that the recommendations be referred back to the Committee for further consideration, with instructions before again reporting to the Council to supply to the Vestry of Lambeth a copy of the inspector's report.

In the discussion which followed, Alderman Ritchie urged the importance of the Council insisting upon necessary sanitary regulations being carried out. It was an acknowledged fact that

the districts named not only did not carry out the by-laws, but did not propose to do so.

On a division Mr. Hubbard's amendment was negative, and the Committee's recommendations were agreed to.

After transacting other business the Council adjourned.

Illustrations.

LINDISFARNE PRIORY.*

WHAT Iona is to Scotland and to Celtic Christianity, Lindisfarne is to Northumberland and the early Anglian missions. Its line of bishops begins with St. Aidan, who founded the see under St. Oswald, and sat as bishop from 635 to 652. He is supposed to have built a temporary church of some kind, but the first building of which there is any record was erected by his successor, Finan, and is described by Bede as being "after the manner of the Scots, not of stone, but of hewn oak, and covered with reeds." Eadbert, between 688 and 698, is said to have taken off the thatch of reeds and covered the church "both roof and walls with plates of lead." This church was burned by the Danes in 875, and the monks fled the place, taking with them the body of St. Cuthbert, and began their strange nomadic life till they settled at Chester-le-Street in 883, and, finally, at Durham in 995.

There is no record of any stone church on the island till the Norman church was built. There can, however, be no doubt that a stone church existed on the site between the ninth and the twelfth centuries.

The abandonment of the site by the congregation of St. Cuthbert brought a change in the constitution of the church of Lindisfarne, and whatever it was in the meantime, it was evidently thought too important a place to be overlooked by the reforming bishop, William of St. Carilef, for he founded here a Benedictine monastery as a cell to the great Abbey at Durham, and the name of the place was changed to Holy Island, it is said, to commemorate the violent deaths of the many religious who had in former times lived there.

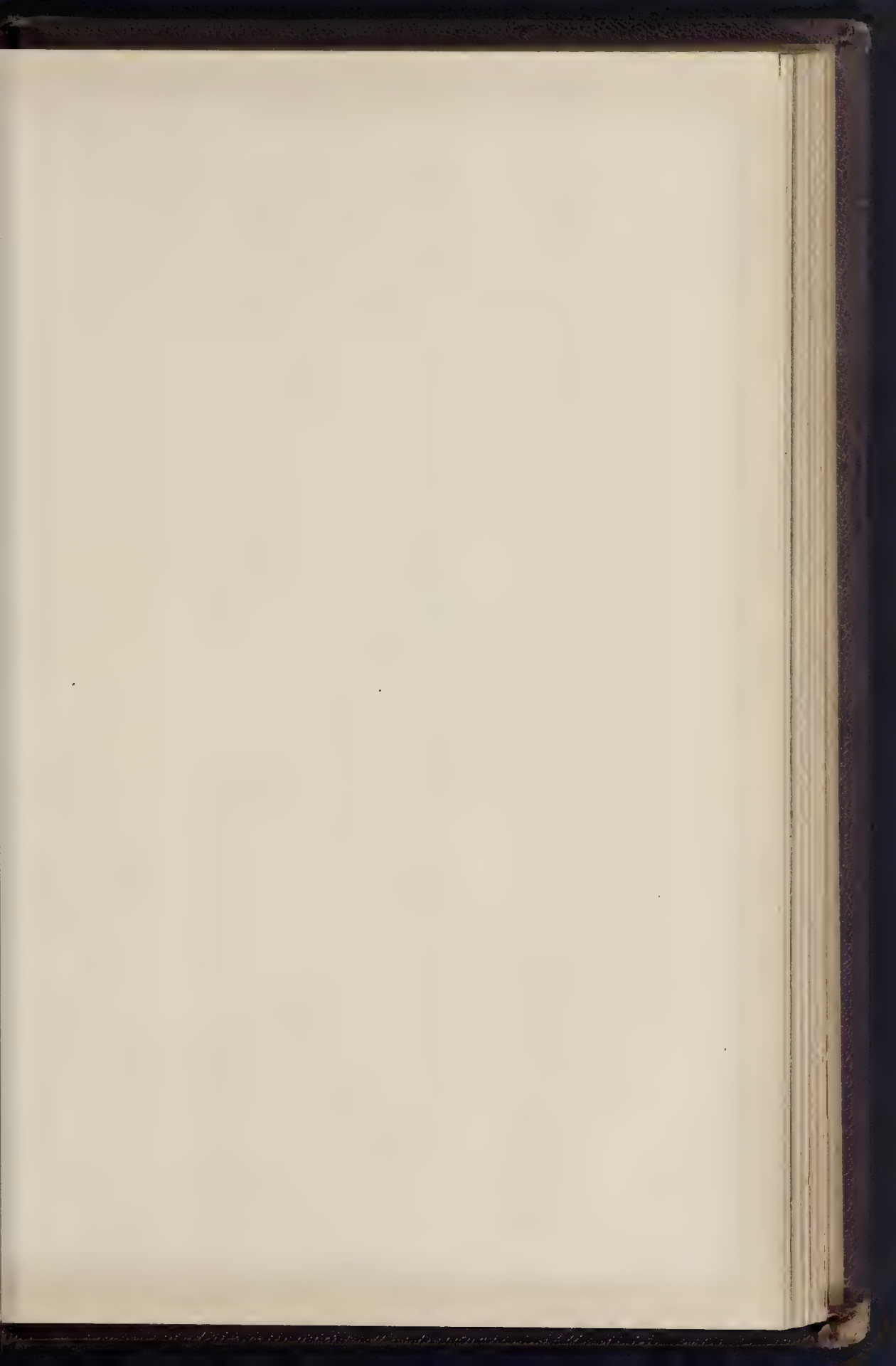
It was not until some time after the death of William of St. Carilef, in 1096, that the existing Priory church was begun, and although the story of the rebuilding, and the circumstances attending it, are graphically related by Reginald of Durham, we are dependent entirely upon the style of the architecture, and a comparison between it and that of Durham Cathedral, for any definite conclusion as to its precise date.

There seems to have been a church of some kind on the site in 1069, as in that year Bishop Egelwine and the congregation fled to Lindisfarne to avoid the troubles following upon the resistance set up in the North against William the Conqueror. They remained on the island for about four months.

Reginald, who was one of the Durham monks, tells us how the bishop was represented on the island by one Edward, who seems to have been a man of singular skill and urbanity. He set to work to improve the buildings of the church, and "erected upon the island, in honour of St. Cuthbert, a church new from its foundations, which he finished of squared stone, with all the elegance of workmanship. The stone, of which there was a lack upon the island, was brought in wains and carts from the adjacent coast, and the men of the neighbourhood willingly lent a helping hand. There is, indeed, enough stone upon the island, but as it becomes friable by the action of the sea, and is apt to crumble, it would be unfit for so large a building. Its fragments, however, served to fill the interstices of the walls."

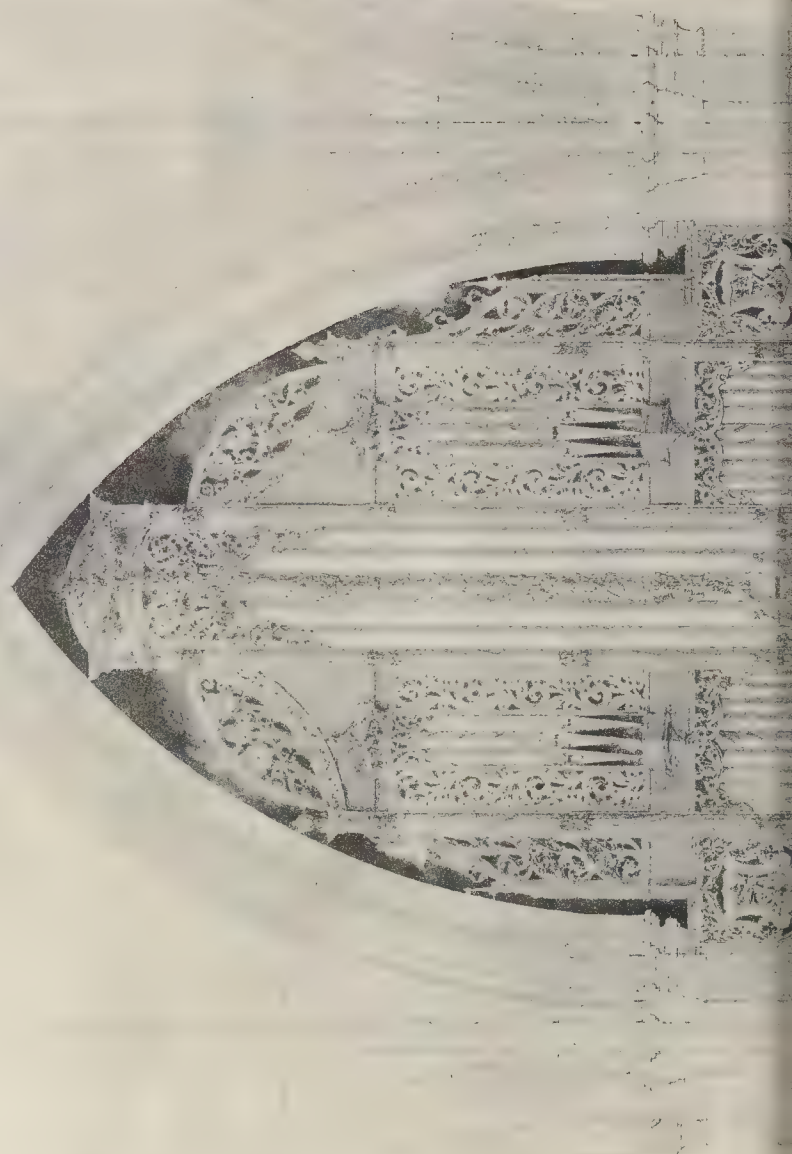
The date of Edward's death has not been recorded. The natural inference from the above passage is that the immediate predecessor of the Norman church had been built of the poor stone on the island, which is a soft white sandstone of a fine grain, while that in the walls of the Norman church is a hard but coarse sandstone of a dark reddish colour. Of this stone, almost the whole church, now in ruins, is built, but the lower parts of the walls of the north transept, the north side of the nave, in one or two places, and the lower portion of the west wall of the choir, on the south side, are pieces of masonry of a totally different

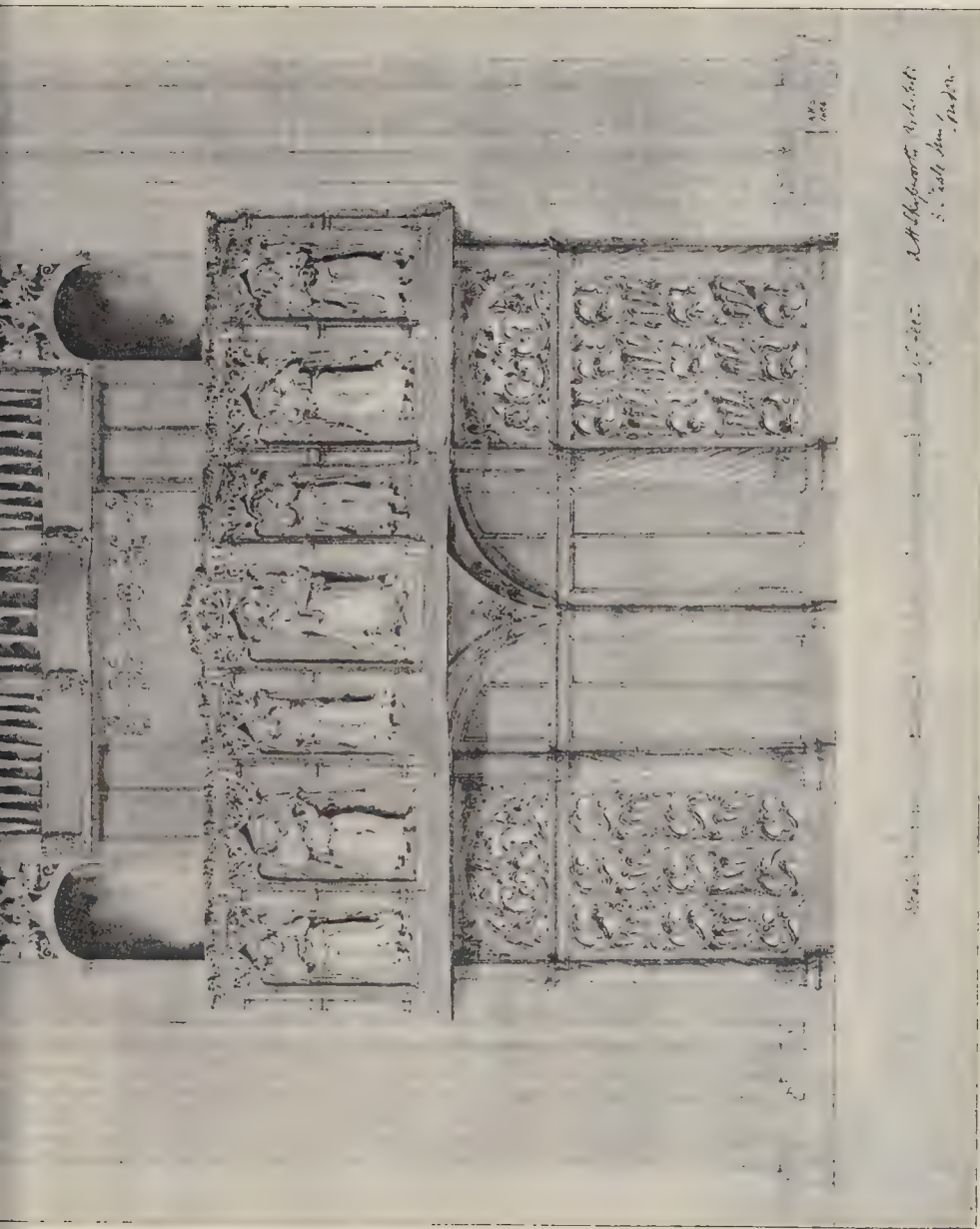
* The series of the "Abbeys of Great Britain" is continued this month with illustrations of "Lindisfarne." Particulars of this and of the three Cathedral series ("England and Wales," "Scotland," and "Ireland") will be found on p. 424; also (on page 1.) of the recent re-issue, in book form, of the series of English and Welsh Cathedrals.



THE BUILDER JUNE 1, 1895.

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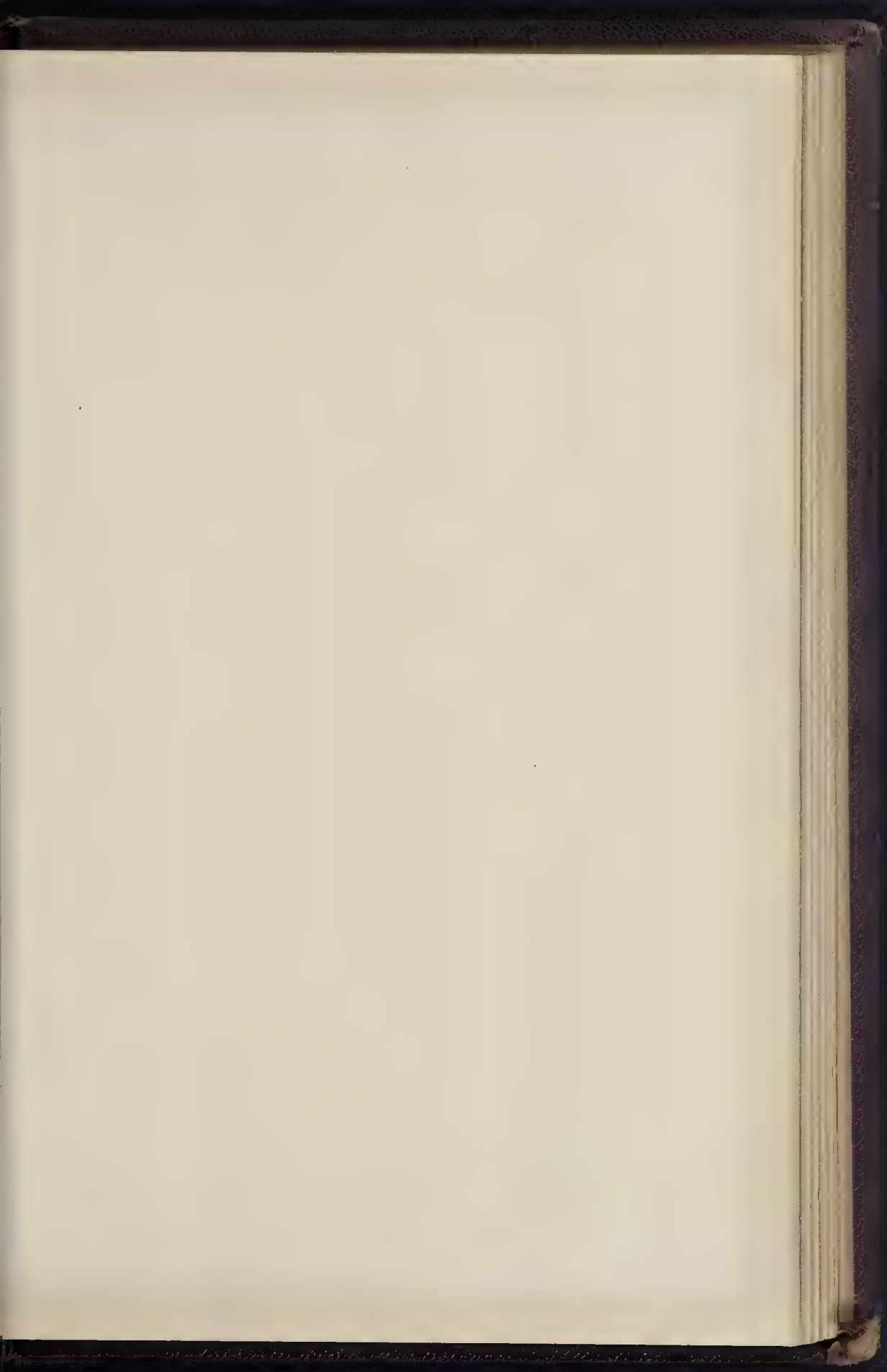


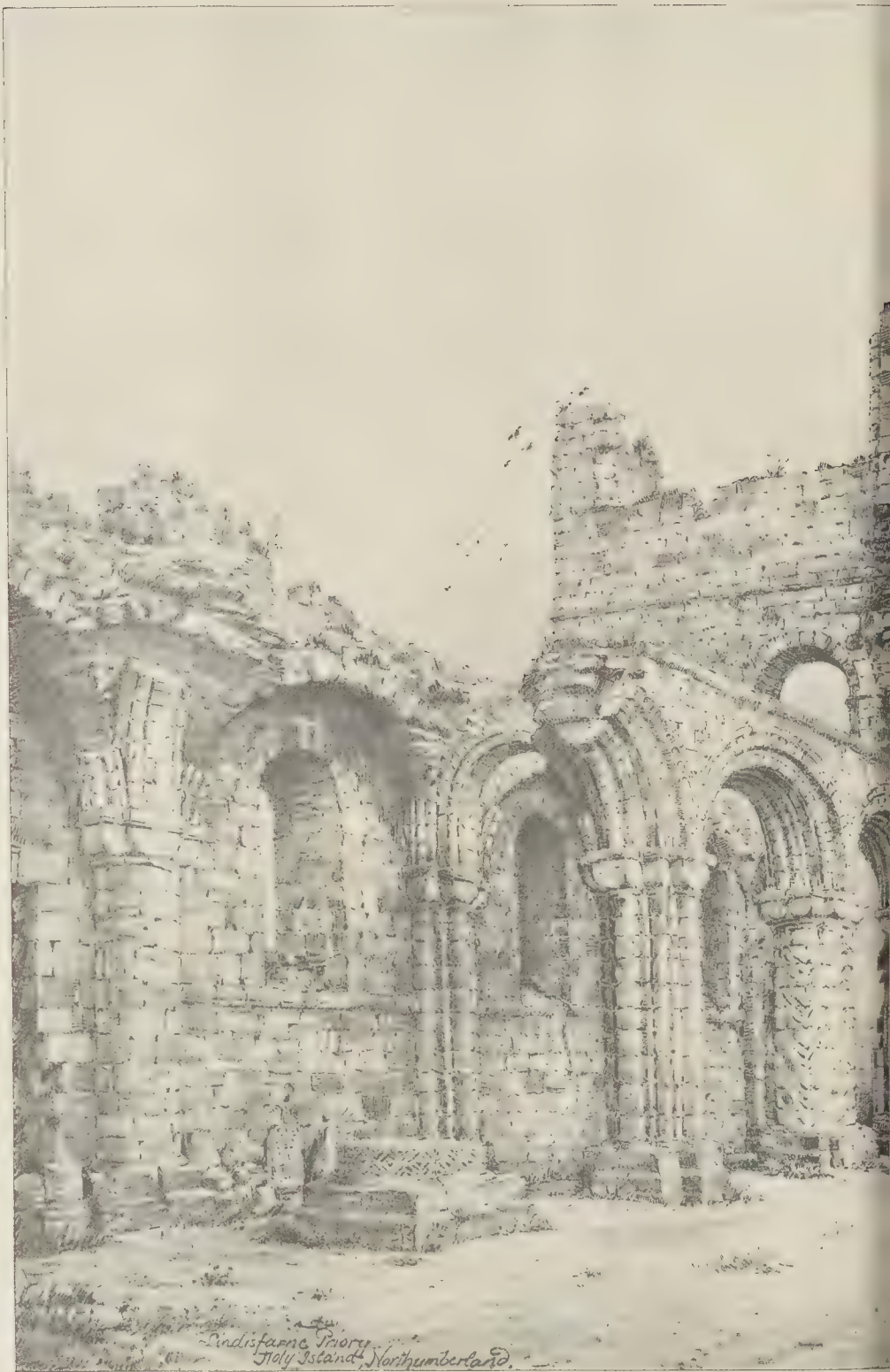


Arch. des Propriétés, 1841, 1842.
S. 101, 102, 103, 104.

1841-1842.

1841-1842.





Lindisfarne Priory
Holy Island, Northumberland.



DISFARNE VIEW LOOKING EAST.

TALL



Sketch of West Front of Lindisfarne Priory.

character. These are seen to be built of the soft white stone, and the walling is coursed rubble work, the stones being long and thin, and very different to the regular square ashlar of the Norman work. It seems that all this inferior walling is part of a former church, and was left *in situ* when the Norman building was set out.

The lower courses of the apsidal termination to the original choir which remain in the ground are clearly of the same period. The strongest evidence in favour of this is the fact that the interior surface of the wall of the apse and of parts of the walls at the west end of the choir adjoining to it are plastered with a thin hard plaster, and this plaster is seen to exist below the level of the floor of the Norman church.

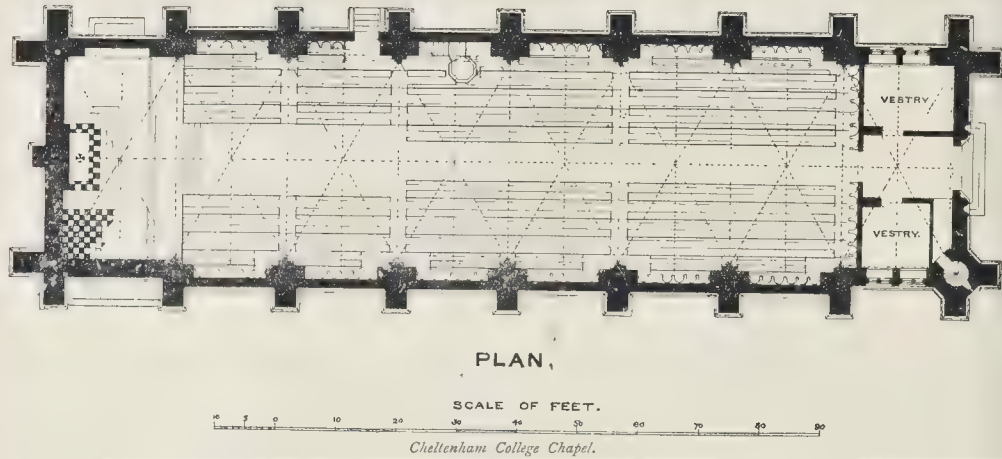
The design of the Norman church is a very fine conception, and, if perfect, would be one of the best examples of the style, as throughout, the principles of Norman architecture were thoroughly and logically carried out. It is on a small scale, and, after the stupendous dimensions of its great prototype at Durham, looks quite puny until one realises the excellent proportions of its various parts and details. The plan comprises a nave of six bays, with aisles, an aisleless transept, with apsidal chapels to the east, one in either wing, and a long aisleless choir. The nave arcades rest on piers alternately cylindrical and clustered, as at Durham. The arches are moulded, but are without hood-mouldings. The cylindrical piers are decorated with sunk mouldings and flutings. Only one pier of each kind is now standing,* these are two at the east end of the southern arcade. The two western piers were fluted vertically like those in the same relative position at Durham. The central pair of cylindrical piers had a treatment which was probably unique. This consisted of three bands of sunk and moulded lozenges in the height of the pier. Between these bands were plain mouldings of bold sections, worked round the circumference of the piers, which gave them the appearance of having been turned in a lathe. A single course of stones is all that now remains of these two piers. These

are the stones with the lozenges, and they have been cemented on the base of the pier they came from on the north side, and are not *in situ*. Engravings of the complete piers are to be found in "Boswell's Antiquities," 1786, and a plate in Turner's "Liber Studiorum." These agree in showing three horizontal bands of lozenges to each pier. The triforium is all gone, but it is known from numerous old engravings, of which that by the brothers Buck, published in 1728, is perhaps the earliest, to have consisted of semi-circular arches of one order, with two sub-arches, forming another order beneath them. The wall plane of the triforium was set back a few inches, and vaulting shafts stood on the triforium string-course, as in St. Carilef's work in the choir at Durham. The clearstory wall was reduced in thickness externally, and had pilaster buttresses, and a single small round arched window to each bay. It had no internal arcade. The north aisle is almost complete, with the exception of the vaulting. Externally it exhibits a bold range of pilaster-buttresses, which rise direct from the chamfered plinth, 9 in. wide, the buttresses have a 7-in. projection, and so stand on the plinth. The elevation is divided by two string-courses, the lower one beneath the sills of the windows, the upper one at the level of the springing of the window-arches is carried over them as a hood moulding. The windows are perfectly plain, both inside and out. The vaulting of the north aisle is one of the most interesting studies connected with the ruins. It shows a distinct advance upon that of the aisles at Durham. The capitals of all the piers and of the responds on the aisle wall, which are magnified vaulting shafts, are compound, and form a Greek cross in plan. At Durham they are compound on the compound piers only, and are octagons on the cylindrical piers. Only one of the transverse ribs remains. It is broad and flat on the soffit and beaded on the angles, and is stilted to the extent of two courses. The diagonal ribs are segmental in their elevation, and have a semi-roll between two hollows in section. The crossing piers have responds composed of three semi-shafts towards the nave, choir, and transepts, and double shafts towards the aisles. The latter are, of

course, the responds of the arches from aisles to transepts, and their twin shafts present the only detail of Lindisfarne which is not now found also at Durham. It is not unlikely that the vaulting shafts of Carilef's great apse were of this form. The crossing arches are all fallen, but a few voussoirs in each order remain over the north-east and south-west piers, which are standing to their full height. From these the section of the arches can be seen. They were of two orders. The inner order has a triple roll between two hollows, and is a very late-looking section for Norman work. The outer orders have bold angle rolls and V channels on the outer wall planes. The nave arch is further decorated by a projecting hood on its western side carved with the herring-bone pattern, a detail which occurs at Durham only in the base moulding of two of the nave piers. The crossing was vaulted at the level of the nave vault, the area being spanned by two very massive diagonal ribs of two orders, the inner one having a semi-roll decorated with sunk chevrons between two rows of zig-zags. The outer orders are plain mouldings. The whole section is richer and later than any vaulting-rib section at Durham. The old views show that an arcade was introduced over the crossing arches, lighting a wall passage from the church. This was of five members, the second and fourth arches being higher than the other three. The passage still exists through the angles over the two standing piers.

The central tower rose three stages above the wall heads. The first received the roofs of the four wings of the church. In the spandrils were windows, two in each face, which lighted the wall passage, and from this access to the roof space over the vaults was obtained. The north-west and south-east angles still remain, as high as the string above the first stage, and show that the angles were reeded, with a sunk roll, as at Selby. The second stage was a low one and perfectly plain. The next, the belfry stage, had external arcades of five members in each face, recessed behind the wall plane, with a corbel table extending the length of the recess. Above was no doubt another corbel table, and a parapet, square angle turrets, and a pyramidal roof.

* There were three pairs of cylindrical and two pairs of clustered piers in the nave when it was complete.



It is fortunate that the west wall of the north, and the east wall of the south, transept remain to their full height, but only a small portion of the lowest stage and the angles of the north and south walls remain. The transepts were each vaulted by a single quadripartite vault springing from corbels in the angles, and had plainly moulded ribs of the same section as the diagonals in the aisles. The internal elevation is of great interest, as it affords a perfect example of an apsidal transept chapel. The apse is shallow, being much less than a semicircle. It is entered through an arch of two moulded orders, springing from double jamb shafts like those of the nave aisle arches. It has a single plain window to the east. The arch has no hood, and four courses above it is a plain string-course, above which is a plain round-headed window. The west wall of the north wing furnishes us with the aisle-arch in the lower stage, which was complete in 1773, and was again completed, with some new stones to strengthen the walls and form a tie in 1888, that date being very properly cut upon it. It has a moulded soffit order, and an outer order with a bold sunk chevron on the face, which is clearly shown in one of Grose's engravings. Above is a much-ruined triforium arch. The north-west angle of the transept is standing to the full height, and the remaining fragment of the north wall shows that it had two tiers of round-headed windows with shafted jambs.

The most puzzling thing in connexion with the church is to decide how the choir was built. There is work of three dates present, independent of insertions. The remains of the pre-Conquest church have already been mentioned. There is also Norman work of two dates. The western part seems to be the earlier, and it may be assumed that the apse of the former church was retained while the Norman church was being built. It was replaced by a short square-ended choir, and this was lengthened at a later period under another hand. The choir was vaulted in three bays, apparently with diagonal ribs only, springing from corbels, which, like the vaulting corbels in the other parts of the church, consist of a chamfered abacus, a cushion capital, and a small carved head below it. In plan the eastern portion of the choir looks like a thirteenth-century extension. The details, however, contradict this, as the string courses, both within and without, the vaulting-ribs, and corbels, are all of Norman sections. The great projection of the eastern buttresses must be accounted for by assuming that the work was really executed in the Transitional period, and the details were made to assimilate to the existing Norman work in the western bay.

The west front is a fine composition. It is flanked by small towers, 10 ft. 10 in. square, which contain staircases, and are divided into stages by string-courses, and have slit lights on their western faces. The central portion is divided into six stages. The lowest is enriched with a deeply-moulded arcade of two arches on either side of the central doorway. The arches spring from triple shafts similar to those of the external wall arcade at Durham. The doorway has a considerable projection, forming a quasi-porch, the gable of which rose into the second stage. Above this is a window opening to the wall passage behind the inner arcade. In the

fourth stage was the principal window, with moulded arch and shafted jambs. On either side of this window are two sunk panels, in the heads of which are some stones decorated with a characteristic Norman surface ornament. The original gable is entirely gone. Internally the west wall shows a richly-moulded doorway, above which is an arcade of five arches, quite plain, but supported by shafts, with cushion capitals and moulded bases. Above this again is a single window.

There were four doorways—the west doorway, one on either side of the nave, and one in the centre of the south transept. The south door of the nave was in the centre—an unusual position—and it seems to have served for both the eastern and western processional doorways generally found. Besides the two newel stairs in the western towers, there were two more in the western angles of the transept. Both doorways and staircases were in the same relative position to those at Durham.

After the extension of the choir, the first alteration was the insertion of a three-light window at the east end of the north aisle to light an altar there. The tracery indicates a date of about 1300. In 1362 large three-light windows were inserted in the south aisle. These had flowing tracery of the stock-pattern of Durham Abbey, which was used over and over again, in the cathedral, at Brancepeth, Jarrow, Monkwearmouth, the parish church, Holy Island, and other places. At the same time, large windows were added, one on either side of the choir. The new east window was inserted in 1431. Its jambs only are original, the arch and wall above being part of Salvin's repairs of 1856.

The church was fortified and crenellated before 1385. Some remains of the crenellations are to be seen. They consisted of the raising the side walls, both of aisles and clearstory, throughout the church, and adding a high embattled parapet with embrasures and cross loops, the roofs being made flat, this alteration must have entirely changed the appearance of the church.

Subsequent to the dissolution the church was used as a Government store-house, but, after the Union of the Crowns of England and Scotland in 1603, it was no longer needed, and it fell into ruin. The walls of the nave and the tower were standing to their full height at the end of the last century. The despoiling process went on until 1844, when it was arrested, and since then the ruins have been repaired and kept in good order.

The domestic buildings are all on the south side of the church. They are extensive and peculiar. They were all cleared out by Sir William Crossman in 1888 and 1889. The amount of ground they cover is not great, and the cloister is exceedingly small. The arrangements are clearly shown on the plan. Many of the walls are standing from 3 ft. to 6 ft. high, and in some places almost to their full height. The vaulted ranges to the east and west sides of the cloister are standing in great part up to above the springing of the vaults. No portion of the domestic buildings is of Norman date; it may therefore be inferred that the Benedictines made use of the buildings of the Anglian period for something like a century and a-half. New buildings seem to have been begun in the first half of the thirteenth century, and to have been

in process of building, extension, or alteration, almost continuously up to the time of the dissolution of the Priory in 1537. The detail is poor throughout, and the group of buildings is not specially interesting from an architectural point of view; but as an example of monastic arrangement, and as showing how the house was defended, Lindisfarne is now of paramount importance, and archaeologists are greatly indebted to Sir William Crossman for the energy and liberality with which he carried on and completed the excavations. A full description from his pen will be found in the "Transactions" of the Berwickshire Naturalists' Club for 1892. CHARLES C. HODGES.

NEW CHAPEL, CHELTENHAM COLLEGE.

This chapel, now nearly finished, was described in the *Builder* of August 5, 1893, when an interior view of it was published. It was then intended only to build seven bays, but in the present year the Chapel Committee decided to complete the shell; and most of the carvings and statues are in their places. The fittings will be temporary. The drawing, in this year's Academy, is by Mr. H. W. Brewer. The architects are Messrs. Prothero & Phillott. HENRY PROTERO.

ORGAN-CASE FOR ST. ALBAN'S, TEDDINGTON.

This is one of the several organ-case designs to be seen in the Royal Academy Architectural-Room this year. It is designed by Mr. A. H. Skipworth.

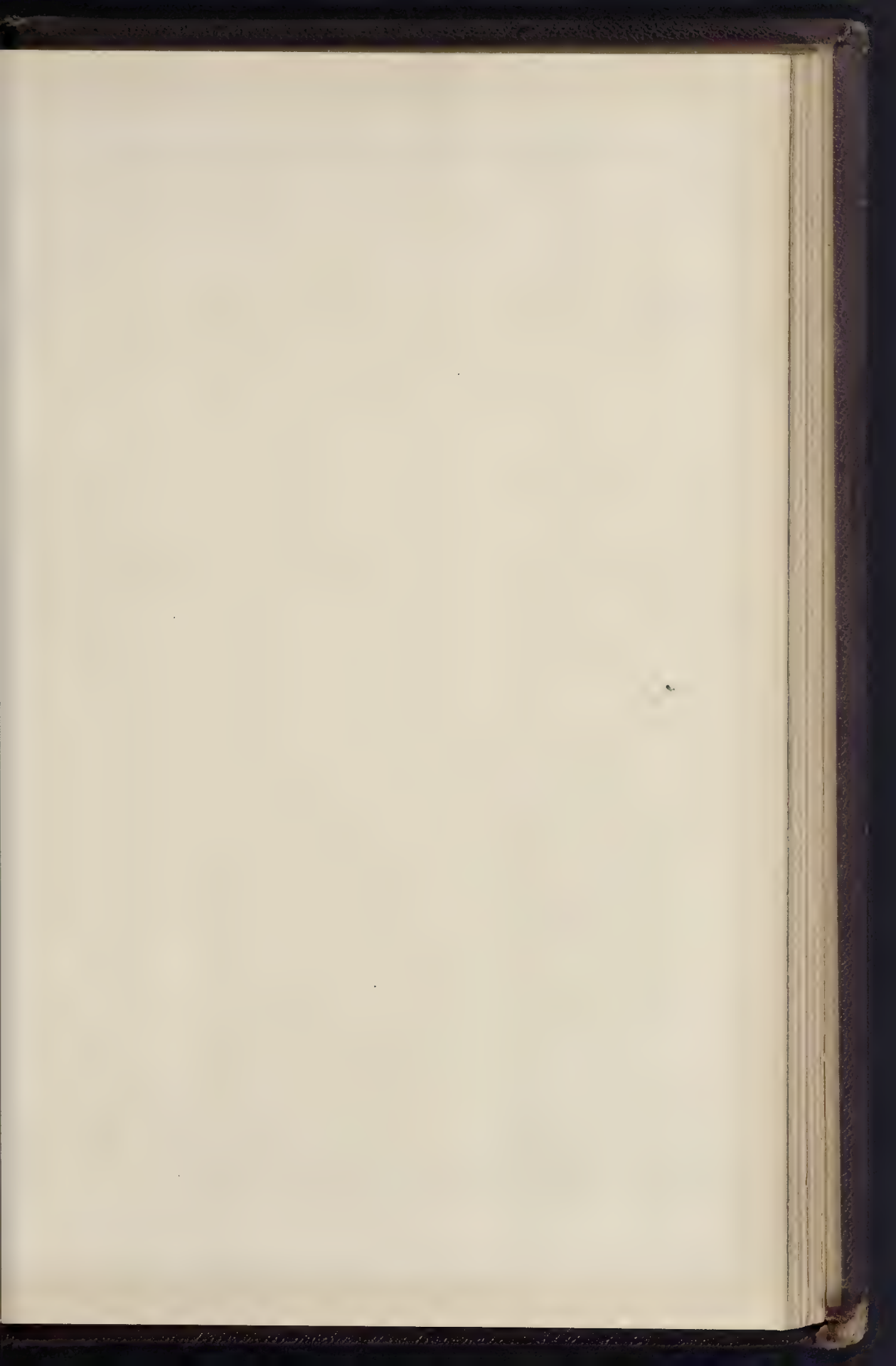
The case is to be executed in oak, which will be stained rather dark and partially gilded. The centre pipe of each compartment will be embossed and gilded. Messrs. Lewis & Co. have erected the works on the platform of the gallery, which has been put up in an unfinished state. The figures on the front of the latter will be in low relief, and entirely gilded on a soft blue ground.

COMPETITIONS.

ASYLUM, HENDON.—The Board of Managers of the Central London Sick Asylum District, Cleveland-street, W., have selected for their new asylum the plans by Messrs. Giles, Gough, & Trollope. Five competitive designs were sent in. An article on the drawings submitted by the competitors will be found on another page.

LEEK MARKETS.—Ten designs were sent in for these buildings about the middle of March, and the Urban District Council have just accepted their Committee's recommendation to preminate the following:—1. Mr. J. T. Brealey ("J.d. stamp"); 2. Messrs. W. Sugden & Son, F.R.I.B.A., and Messrs. Mosley & Anderson ("Bon Marché"); 3. Messrs. Baynes & Campbell ("Auld Lang Syne"). Mr. John Brealey, the Chairman of the Urban District Council, presided at this meeting. Messrs. Sugden had memorialised the Council to appoint a professional assessor to adjudicate upon the various designs sent in, but this was negatived, though supported by a strong body upon the Council and by the local Press.

CHURCH, WAVERLEY PARK, LONDON.—The competition for a new church at Waverley





NEW CHAPEL, CHELTENHAM CO.



PHOTO J. P. O. S. H. A. C. E. S. T. A. E. A. S. T. H. A. D. I. C. S. T. R. E. E. T. I. N. T. H. E. N. E. Y.

ark, London, S.E., has, we are informed, been decided in favour of the design submitted by Mr. Lamp, of Woking.

NEW WORKHOUSE, IPSWICH.—The Ipswich Board of Guardians, at their meeting on Friday last week, decided to appoint Mr. Charles Barry as assessor.

ARCHITECTURAL SOCIETIES.

NORTHERN ARCHITECTURAL ASSOCIATION.—On the 25th ult. an outdoor meeting of this association was held, when thirty-eight members attended. Assembling at Jarro, the first place visited was Christ Church, where the Rev. T. F. Watson received the members, who examined the new chancel-screens and fittings recently erected in memory of the late Lord Northborne, on designs by Mr. Crawford Hick, architect, Newcastle. The party next proceeded to the old church (St. Paul's). Embarking on board a steam-launch the members proceeded down the river and viewed the lighthouse in progress of erection on the South Pier, and then landed at the pilots' landing. Conveyances were in waiting, and the party drove to St. Michael's Church, Westoe, where the Rev. C. E. Adamson conducted them over the building, which has just recently been enlarged by the addition of aisles from the designs of Messrs. Hicks & Charlewood, architects, of Newcastle. Thence proceeding to the village of Westoe, the members were permitted by the Mayor of South Shields (Alderman R. Headhead) to view his residence, which was erected several years ago from the designs of Mr. J. Stevenson, architect, of London. Finally the party proceeded to Harton Cemetery and inspected the chapels and entrance-lodge erected in 1890, and designed by Mr. Henry Grieves, of South Shields. Lastly the party was entertained at the County Hotel by Mr. J. H. Morton, after which votes of thanks to him, to Mr. J. W. Donald, and Mr. H. Grieves were carried by acclamation, as also was a similar compliment to Messrs. Brigham and Cowan and the Mayor. Among those present were Mr. Jos. Oswald, President; Messrs. F. W. Rich, Vice-President; B. Plummer, Hon. Secretary; J. T. Cackett, Treasurer; Wm. Glover, H. C. Charlewood, J. W. Taylor, H. G. Badenoch, H. Grieves, W. Donald, and others.

ENGINEERING SOCIETIES.

THE INSTITUTION OF CIVIL ENGINEERS.—The annual general meeting of this Institution was held in the Hall of the Royal United Service Institution, on the 25th ult., Sir Robert Atkinson, K.C.B., President, in the chair. The report of the Council commenced by referring to the change that had taken place in the Hall of the Society during the past twelve months, during which 29 Members, 286 Associate Members, and 5 Associates had been elected, 12 Members and 3 Associate Members were stored to the roll; while the deaths, resignations, and erasures amounted to 170. The net increase was therefore 155, or at the rate of nearly 3 per cent. per annum. The numbers of classes on the books at the end of the Institution year were: Honorary Members, 17; Members, 1,862; Associate Members, 3,687; Associates, 355; making a total of 5,921. Attached to the Institution, though not forming part of it, is the Student class, the conditions of admission of which had continued to exercise the earnest attention of the Council. For the first time since the introduction of the higher qualifications of candidates for admission as Students, the Council is able to report an effective increase in the roll, the numbers on March 31, 1895, being 816, or more than at the same date last year. The statement of accounts, as vouched for by the auditors, showed that the receipts of the year had been:—On income account, 20,970l. 3s. 10d.; capital account, 8,933l. 1s. 2d.; and on sundry funds account, 445l. 13s. 2d.; together, 348l. 18s. 2d. The general expenditure amounted to 18,385l. 10s. 11d. Capital expenditure had absorbed 7,130l. 8s. 11d., mainly on account of the new building; and trust funds expenditure, 492l. 9s. 6d.; together, 7,622l. 9s. 4d., leaving to the necessity of delivering, in April, a meeting-room to the contractors for the new building, the Institution met for the reading and discussion of papers on only twenty evenings during the past session. Exclusive of the President's address, fourteen original communications were read and discussed, but the exceptional interest evinced in the debates on some of the subjects brought forward had resulted in a full amount of material being available for the cus-

tomary four volumes of Minutes of Proceedings. A brief summary was given of the several papers brought under the notice of the members. Reference was also made to the large number of interesting communications selected for printing in Section II. of the publications. For some of these papers, awards of medals or premiums, or both, had been made to Messrs. A. J. Durston, R.N., J. I. Thornycroft, S. W. Barnaby, W. Duff Bruce, S. J. Berg, C. Butters, E. Smart, J. Richardson, A. Sharp, J. A. Griffiths, A. J. Hill, O. Guttman, K. Leibbrand, A. Scott, D. Cunningham, and to the representatives of the late H. Gill. As in the preceding Session, eleven supplemental meetings for Students had been held, at which papers were read and discussed—some exhibiting sufficient merit to warrant their publication in the Minutes of Proceedings. The reports received from Manchester, Glasgow, Birmingham, Newcastle-on-Tyne, and Leeds, showed that the Associations of Students at those centres were continuing to fulfil well the objects for which they were established. The Council had awarded Miller Prizes to the following Students for papers read at the Institution and before the Local Associations:—Messrs. W. G. Wales, S. H. Barraclough, E. Matheson, A. M. Stewart, R. C. Farrell, and H. Fowler. The third of the series of "James Forrest" lectures had been delivered, on May 2, by Professor W. C. Unwin, F.R.S., M.Inst.C.E. The completion was announced of the new Library Catalogue, comprised in three volumes, copies of which would be issued to public libraries and those of educational and scientific bodies in all parts of the world. The new subject-index to vols. lix.-cxviii. was in print and would be issued during the recess. The Council had given considerable attention to the question of enabling all entitled to vote at the annual election to exercise that privilege, whether present at the meeting or not. The opinion of counsel was, however, that under the existing charters such votes could only be given personally. The report having, after discussion, been adopted, votes of thanks were passed to the President, the Vice-Presidents, and the other Members of Council for active services in the management of the Institution; to the auditors for their care and trouble in examining the accounts; and to the scrutineers of the ballot. The ballot for Council resulted in the election of Sir B. Baker, K.C.M.G., as President; of J. Wolfe Barry, C.B., W. H. Preece, C.B., Sir Douglas Fox, and James Mansergh, as Vice-Presidents; and of W. Anderson, D.C.L., Alex. R. Binnie, W. R. Galbraith, J. H. Greathead, J. C. Hawkshaw, C. Hawksley, Dr. John Hopkinson, Alex. B. W. Kennedy, LL.D., Sir G. L. Moleworth, K.C.I.E., Sir Andrew Noble, K.C.B., Sir E. J. Reed, K.C.B., M.P., W. Shelford, F. W. Webb, Sir W. H. White, K.C.B., and Sir E. Leader Williams. The Session was adjourned to the second Tuesday in November.

Correspondence.

To the Editor of THE BUILDER.

WILLESDEN SCHOOL BOARD.

SIR,—I learn that the Board have set aside my award in the limited competition for the Dudding Hill-road School. I consider this very unfair to Mr. Caroe, to whom I awarded the first place, he having, in my opinion, fairly and honourably won it. It is true that in the conditions—which were not drawn or revised by me—the Board did not in terms bind themselves to act on my award, or to employ one of the competing architects, but I think that in the absence of anything to the contrary, the fact that they selected three architects implied the employment of one, and the fact that they appointed an assessor implied that they intended to be guided by his advice.

I regret having been associated with a competition which has, as it seems to me, resulted so unfairly, and I therefore hand you copies of my award, and of letters which I subsequently addressed to the Board in the hope of securing a different result.

The moral appears to me to be that architects cannot be too careful in entering into competitions the conditions of which are not perfectly satisfactory. J. MACVICAR ANDERSON.
May 29, 1895.

"6, Stratton-street, W., April 23, 1895.
DEAR SIR,—I have very carefully examined the six sets of designs, which have been submitted in competition for the Leopold-road and the Dudding Hill-road Schools of the Willesden School Board,

and I beg to hand you herewith—for the guidance of the Board, but not for publication—notes on each design, which will be found to embody replies to the questions you forwarded to me on the 8th inst., so far as I am able to furnish them.

In view of the conditions of the Competition, and the departure from them, which some of the designs exhibit, I place the designs in the following order of merit, viz.:—

1. Leopold-road School.

1. Mr. F. E. T. Lawrance.
2. Mr. John Lodd.
3. Mr. Fred Mew.

Dudding Hill-road School.

1. Mr. W. D. Caroe.
2. Mr. Charles Bell.
3. Mr. Edward Gabriel.

Believe me, yours very truly,
J. MACVICAR ANDERSON.
W. Vincent, Esq., Clerk,
Willesden School Board.

6, Stratton-street, W., May 6, 1895.

DEAR SIR,—A copy of the *Middlesex Courier* for the 3rd inst. has been sent to me, in which, on page 6, under the heading of 'Willesden School Board,' is a notice of 'the proposed new schools.'

As, in this notice, there are some inaccurate statements relating to me, I have thought it right to send a few lines of correction to the Editor, of which I hand you a copy.

May I add, that if the notice gives a correct report of what has transpired, I feel bound to say—for the guidance of the Board—that it would, in my opinion, be grossly unfair to think of adopting the design of Mr. Edward Gabriel, for the reason that his design fails to comply with one of the conditions of the competition, viz.:—

'The building to be kept as far away as possible from the Metropolitan Railway.'

This, in my judgment, disqualifies the design. Moreover, the estimate of the author appears to me to be altogether inadequate.

Will you be so good as to read this letter to the Board?—Believe me, yours very truly,

J. MACVICAR ANDERSON.
W. Vincent, Esq., Clerk,
Willesden School Board.

To the Editor of THE MIDDLESEX COURIER.

SIR,—Observing in your paper of the 3rd inst., a copy of which has been sent to me, a statement to the effect that in the limited competition for the Dudding Hill-road School, I had recommended the designs of Mr. W. D. Caroe and Mr. Edward Gabriel, I shall be glad if you will allow me to say that this is not the case, and that I placed the designs submitted in the following order:—

1. Mr. W. D. Caroe.
2. Mr. Charles Bell.
3. Mr. Edward Gabriel.

In further stating that I did not wish my report to be publicly read, your reporter is evidently under some misapprehension. My award was embodied in a letter to the Clerk of the Board, and, so far as I am concerned, is public property. It was however accompanied by some notes, embodying information which the Board had desired me to furnish, and these I gave with the reservation that they were not for publication.

I am, Sir, Your obedient Servant,
J. MACVICAR ANDERSON.
6, Stratton-street, W., May 6, 1895.

6, Stratton-street, W., May 22, 1895.

DEAR SIR,—Reverting to the notice of the proceedings of the Willesden School Board, published in the *Middlesex Courier* of the 3rd inst., to which I referred in my last letter, I observe that great stress seemed to be laid by several members on the economical nature of Mr. Gabriel's design, his estimate being only 9,900l.

Mr. Gabriel's design I disqualified on the ground that it did not comply with one of the conditions, and on that ground alone it ought not—in fairness to the other competitors—to be considered. As, however, some members of the Board seem to be attracted by its supposed economy, it occurs to me to add to what I have already stated that I have no doubt Mr. Caroe's design would be the most economical to execute, while his building would undoubtedly be the most economical to maintain.

Mr. Caroe's estimate is obviously an honest one—not likely to be exceeded—and possibly more than sufficient. Mr. Gabriel's estimate, on the other hand, is, in my judgment, absurdly inadequate and absolutely certain to be largely exceeded.

Although the Board have not sought my further advice in the matter, I cannot refrain from urging them to adopt my Award, not only because it is the only fair course to pursue towards the competitors, but because it is in their own interest to do so.

I make no apology for asking you to be good enough to submit this letter to the Board, my desire being that a competition in which I was invited to adjudicate should be settled on a fair and equitable basis. Believe me, yours very truly,

J. MACVICAR ANDERSON.
W. Vincent, Esq., Clerk,
Willesden School Board.

SIR.—Having answered an advertisement in the *Builder*, I was invited by the Willesden School Board to compete with two other architects for the Dudding Hill-road Schools.

A concurrent competition, three other architects being invited, was at the same time instituted for schools at Leopold-road.

After the first issue of instructions, the Board, answering a protest from me, stated that designs were to be signed openly by the competitors.

The first instructions were withdrawn, and I (presumably also other competitors) was asked to advise and suggest as to the best form of schools—a matter over which I took considerable trouble.

Architects were instructed to state their own estimates.

Mr. Macvicar Anderson was chosen assessor by the Board. He placed my design first, Mr. Bell's second, and Mr. Gabriel's third, in order of merit.

It appeared, from the Board meeting alluded to last week in your columns, that a strong party on the Board was bent upon adopting the design placed third.

Finally, the Board resolved, last Friday, to throw over all the competitors (albeit invited) and to employ the architect, already selected in the concurrent competition, for this work also. The members of the Board who loyally supported the upholding of the assessor's award, voted under protest for this resolution, thereby defeating the partisans of Mr. Gabriel.

No suggestion whatever has been made of any fault or inadequacy in my design, the only grounds which would seem to justify the Board's action. The Board has not favoured me with any intimation upon the subject; but I understand that the assessor's award was ostensibly thrown over on the ground that my estimate was high—higher than any other sent in. The Board, however, paid no attention to my explanation that I had given in a price (not founded upon cubing) for a perfectly-equipped school, including many optional and alternative materials which could be omitted, if economy was to be a first consideration, though there was no hint of this in the instructions. Neither did it pay any attention to the assessor's independent opinion that my design was not more costly than others submitted.

I was, in fact, thrown out for sending in a fully inclusive and honest estimate.

I feel that I can fairly ask you to give publicity to this on the score of warning other architects from entering even upon limited and invited competitions of the kind, no matter how plausible and morally binding upon their authors instructions may seem to be, which only imply, but do not really include, the absolute finality of the assessor's award.

W. D. CAROE.

ARCHITECTURE AT THE ROYAL ACADEMY.

SIR,—May I be permitted to point out, with reference to the plan of Badsworth Grange, that there is a difference of level between the lawn on the east front and the carriage drive on the west front of between 4 ft. and 5 ft. The main floor level of the house is 6 in. or 8 in. above the level of the lawn, and the steps in the porch are merely to give access to the main floor. They are, in fact, of stone, whereas the halls and staircase are panelled and floored in oak.

CHARLES F. FERGUSON.

HOLY TRINITY CHURCH, BOURNE-MOUTH.

SIR,—In your issue of May 18 last, a letter appears with regard to buildings at Bournemouth, in which Holy Trinity Church is referred to, with commendation, but a Mr. A. F. Parken is credited with being the architect of the church. Will you permit me to point out that the Church of Holy Trinity was erected from my designs, and under my supervision.

CHARLES F. FERGUSON, F.S.A.

A CORRECTION.

SIR,—Kindly allow me to draw attention to a printer's error in your number of May 4th, by which some drawings of mine in this year's Royal Academy Exhibition have been attributed to "Mr. Mitcham."

CHAS. H. M. MILEHAM.

GENERAL BUILDING NEWS.

CHURCH, RIPLEY, DERBYSHIRE.—The new church for St. John's district, at Ripley, has just been consecrated by the Bishop of Southwell. The foundation-stone of the new church was laid in June, 1893, the site being given by the Butterley Company. In plan the church consists of a nave and aisles, with western porches at the end of each aisle; chancel, with choir and clergy vestry on north side, and organ-chamber with basement under on the south side. The nave is 80 ft. long by 52 ft. wide, including two aisles of 12 ft. each. It is 28 ft. high to the plate, and 48 ft. to the ridge. At present the funds only permit of the nave and aisles being completed, and the last bay of the same has been utilised for the purpose of providing temporary chancel, vestries, &c. The future chancel will be 30 ft. long, 24 ft. wide, and 42 ft. high to the ridge, with clergy and choir vestry divided by a movable screen. The per-

manent organ-chamber will be on the opposite side of the chancel to the vestries. The church itself is built in the Early Decorated style, with square-headed windows to the aisles and clearstories, filled with varieties of tracery. The west window is a three-light cusped lancet window, with high central light, which has been filled with stained glass by Messrs. Ward & Hughes, of London. The temporary east window consists of plain lancets. The building is of brick, with Coxbench stone dressings. The nave and aisles are paved with Maw's tiles, and the seat floors boarded. The font is of Mansfield stone. The heating is by hot water, on the low-pressure system, by Messrs. Jerram & Co., of Derby, and the gas-fittings and other ornamental ironwork have been executed by Mr. E. Haslam, of Derby. Accommodation in the complete church will be provided for about 550, but the part now erected will only seat some 400 under ordinary circumstances. The cost of building this first section amounts to about 3,800l. The contractor for the works was Mr. W. Salt, of Ripley, and Messrs. Slater, of Coxbench, and Mr. Norman, of Marehay, have executed the stonework and brickwork respectively. The architects for the building are Messrs. Naylor & Sale, of Derby. The teredos is of Hopton stone.

INTERMEDIATE SCHOOLS, BARRY.—On the 18th ult. the Chairman of the School Board, and other members of the Intermediate school committee paid a visit of inspection to The Buttrills, near Barry. The buildings are arranged with boys' and girls' entrances at either end, with cloak-rooms and lavatories adjoining each. There are two class-rooms for boys and one for girls, with a large assembly-hall to accommodate all the students. An art studio and chemical laboratory are provided for the use of both sexes. At the end of the girls' corridor is entered a cookery kitchen, with scullery, &c., and a laundry. Play-sheds in both playgrounds are provided, and a large workshop for mechanical instruction is built in the boys' grounds. Private rooms are provided for the head-master and head-mistress, as well as private rooms for the teachers, and there are also apartments for the use of the caretaker. Accommodation is provided for sixty boys and forty girls. The schools have been erected at a cost of about 2,700l. by Mr. H. J. Money, Barry, with Mr. T. Jenkins, Barry, clerk of the works, and from plans selected in competition, prepared by Mr. W. H. Dishwood Caple, architect, Cardiff.

MISSION HALL, EDGEHILL, LIVERPOOL.—On the 23rd ult., the new mission-room and schools built in Uxbridge-street in association with St. Catherine's Church, Tunnel-road, Edgehill, were opened. The new buildings occupy the site of schools erected some thirty years ago. The school buildings occupy the ground-floor, and above them the mission-hall is placed. They consist of two departments, for girls and infants, and contain two large schoolrooms, four class-rooms, and cloak-rooms. A class-room is provided for the purposes of a cookery-school. Accommodation is provided for 228 girls and 196 infants. The mission hall, measuring 51 ft. long by 40 ft. wide, occupies the entire area on the first floor above the two schoolrooms. It is approached by two stone staircases, with entrances in the principal front of the building in Uxbridge-street. A committee-room is provided in connexion with the mission hall. The building is heated throughout by hot water, but fire-places are provided in addition for occasional use, in the school-rooms, class-rooms, and committee-rooms. Local bricks have been employed for the walls, with Raabon brick dressings, and a few features are worked in red sandstone. A dado of glazed brickwork is carried round the internal walls of the rooms and staircases. The buildings have been carried out from the designs of Messrs. Arthur Baker, and Harold Hughes, of London and Bangor, North Wales, and have been erected under the care of Mr. Harold Hughes and Mr. W. L. Tiffin. The contractors were Messrs. Brown & Backhouse, of Liverpool.

WESLEYAN SUNDAY SCHOOLS, PLYMOUTH.—On the 23rd ult., the Sunday-school premises attached to King-street Wesleyan Church, Plymouth, were opened. The cost of the new schools is about 3,000l. Built of local stone with buff facing bricks, the added structure comprises a lecture-hall capable of holding about 400 people, two class-rooms for infants, large enough to accommodate 250 scholars; a young men's meeting-room and other conveniences. The upper story includes a schoolroom, where 500 scholars can be seated; seven smaller class-rooms, a library, a tea-room, and a ladies' lavatory and cloak-room. The work has been carried out by Messrs. T. May Bros., of Plymouth, from plans designed by Mr. H. J. Snell, Mr. R. Darke having acted as clerk of the works.

SMALLWOOD HOSPITAL, REDDITCH.—This hospital has just been opened by Lady Windsor. The plans were prepared by Mr. William Henman, architect, Birmingham, and the building has been erected by Messrs. C. G. Hinns & Sons, Redditch, under the supervision of Mr. Herbert R. Lloyd, of Birmingham.

BAPTIST CHURCH, MOTHERWELL, LANARKSHIRE.—On the 25th ult. the memorial-stone of the new Baptist Church in course of erection in Motherwell was laid by Mr. G. W. Elmslie. The new church, which is situated at the junction of Lochend-street with Windmillhill-street, is from designs by

Mr. Alexander Cullen, architect, Motherwell, and is built of red sandstone from Cornecockle Quarry, Dumfriesshire. Accommodation will be provided for about 400 persons, with baptistry, and the necessary retiring rooms and vestry. The total cost will be about 1,250l. Messrs. Miller & Ferguson, Motherwell, are the builders.

WORKMEN'S INSTITUTE, TREORKY, GLAMORGANSHIRE.—On the 27th ult., a Workmen's Library and Institute was opened at Treorky. The building is situated on the road leading from Treorky to Cwmpark, and is built in the Gothic style, with native stone-walling and Forest of Dean dressing. There is an entrance of 10 ft. wide, approached by stone steps leading up to a vestibule on the first floor, from which branch off two rooms, one a smoke-room and the other a library and news-room. On the basement there is situated a refreshment-bar, private refreshment-room, and caretaker's apartments. On the second floor there are a couple of rooms of exactly the same dimensions as those on the floor below—viz., 22 ft. by 22 ft., exclusive of two large bay windows. The contractors were Messrs. Mathias & Edwards, of Treorky, the plans being prepared by Mr. Jacob Rees, architect to the Ystradgofed School Board.

SANITARY AND ENGINEERING NEWS.

WATER AND SEWERAGE WORKS, LEIGHTON BUZZARD.—On the 23rd ult., the Chairman of the Urban District Council of Leighton Buzzard, Mr. W. S. Page, J.P., laid the foundation-stone of the water tower. On the occasion a silver trowel was presented by the engineer, Mr. H. Bertram Nichols, C.E., of Birmingham. The water tower will contain on the ground floor level engines for raising the water from the well and bore-hole beneath, also engines and air-compressors for actuating the ejectors which raise the sewerage from several low points in the town. Messrs. Garlick & Horton, Limited, of London, are the contractors.

WIDENIDGE AND OATLANDS SEWERAGE.—These works are now sufficiently finished to enable the house drains to be connected to the sewers. The accounts were last week settled by the Sewerage Committee, and the total cost of the engineering works (exclusive of land and fees) has been 44,125l. 17s. 6d. This amount includes certain extras ordered by the Council, including the cost of the private drains in all the streets which they decided to lay to the curbs at the public expense; additional streets sewered through increase of population; additional tank and other works. There are nineteen miles of sewers, part of them near, and below the level of the Thames, and many miles are below subsoil water level. The amount of subsoil water entering the whole of the sewers was last week officially tested in the presence of witnesses, and was found to amount to the extraordinarily low total of 1,440 gallons in twenty-four hours, all of which was made to run through a 1-in. iron pipe laid at the bottom of the outfall sewer. There are two sets of pumps, and one set can pump out all the twenty-four hours' leakage in one and a half minutes. This result has been obtained by unusual engineering precautions, by a good conscientious contractor, and by a zealous clerk of works. Iron pipes were used in some lengths, Hassall's pipes in others, and ordinary pipes elsewhere, with special precautions with manholes, subsoil pipes, concrete, junctions, &c., &c. The sewers include a Dortmund tank, besides horizontal precipitation tanks, and the mud will be pressed. There are no land drains connected with the river or any dykes, as all the effluent will pass away into the underground strata. The engineer for the works is Mr. W. H. Radford, C.E., of Nottingham; the contractor, Mr. John Jackson, of Plaistow; the pumping machinery has been supplied by Messrs. Davey Paxman & Co., of Colchester; the precipitating and pressing machinery by Messrs. Manlove, Allott & Co., of Nottingham; and the iron pipes by the Stanton Iron Works Company.

STAINED GLASS AND DECORATION.

MEMORIAL WINDOW FOR ST. GILES'S CATHEDRAL, EDINBURGH.—A new stained-glass window, which is intended to be a memorial of the Lord High Commissioners of the Victorian era, has just been placed in St. Giles's Cathedral. The window, which is that over the Royal pew, is of five lights, with tracery and traceried heading. Only the five lights in the upper tier above the tracery are being filled meaning. The uppermost portion of the tracery openings is treated with the Royal Arms, whilst the arms of the five present donors appear in the remainder. The tier of the window proper, which is now being filled in, represents St. Peter and St. John before the Council of the High Priests, as recorded in Acts iv. St. Peter and St. John are represented hands announcing his mission to the High Priest, who is represented seated in the fourth light surrounded by his Council. Two Roman soldiers, together with the lame man whom Peter had recently healed, occupy the first light. All the subjects are shown beneath architectural canopied ornament of a light coarseness. The lower tier of the window is intended to be filled

when the other donors come forward, with a representation of St. Peter making his defence before the brethren at Judea. The window has been executed at the studios of Messrs. A. Ballantine & Hardiner, Edinburgh.

FOREIGN AND COLONIAL.

FRANCE.—The jury of the competition for a Hôtel de Ville at Creil (Oise) has awarded the first premium to M. Paul Héneux, architect, of Paris, designer of the Mairie of Lilas, of which a view was given in the *Builder* some years ago. The second premium has been awarded to M. Elphège Portemer, of Creil, whose subscription has been opened among the former pupils of M. Jules André for the execution of a medallion portrait of the eminent architect, to be placed in Montparnasse cemetery. Last week took place, in the cemetery of St. Germain-en-laye, the inauguration of the monument to Félicien David, the composer. It is adorned with a marble bust executed by Chapu. At the foot of the monument is a figure of a woman scattering flowers. The State and the Municipality of Perigueux are in agreement as to the preservation of the episcopal chapel in the Renaissance style known as the "Chapelle St. Jean," which is in a dilapidated state. The building dates from 1521. —M. Decroix, architect, of St. Omer, has been commissioned to surround the monument which is to be erected at Calais to the memory of Eustache de St. Pierre and his companions. The sculptural portion of the monument will be carried out by M. Rodin. —New barracks are to be built at Melun at a cost of 2,500,000 fr. —The committee for raising the funds for a monument to the late Marquis de Roche-sur-Yon has unanimously accepted the model for the statue which has been executed gratuitously by M. Gerôme. —In a field near Ainay-le-Château have just been found a number of gold and silver coins of the Merovingian epoch, as well as various objects in bronze, including a musical instrument. —A new local railway is being constructed in the Department of the Rhône, from Lyon St. Paul to Fourvière and Lysayse. It will be partly a rope railway and partly electric. —A committee has been formed to raise a new statue of Jeanne d'Arc in Paris, which may be observed, has already two such statues, that by M. Fremiet and that by M. Carpeaux.

GERMANY.—The number of pupils at the Royal Technical College at Berlin is rapidly increasing. Last winter the number was 2,632. There were a large number of foreigners among the students, notably Russians (95) and Norwegians (40). England had eight representatives. —The Prussian Budget for the year 1895-96 has no less a sum than fifty-three million marks (about 165,000,000) for the maintenance of the railways. —The annual list of reports handed in by the German Technical Advisers attached to the Embassies of the country has been published. We again notice that there is no technical representative at the London Embassy. The attaché at St. Petersburg appears to have been the most active in sending in reports on Russian railway matters. —The annual Schinkel medals have this year been awarded for the best designs of a Palais des Beaux-Arts. There were six candidates, Herr I. Hermann was first, and Herr Dürpfeld (a well-known architect) was second. —The Hanseatic City of Bremen has shown a liberality to its building officials that is not often met with. On the completion of the new works on the Weser, Oberbaudirektor Franznis has been given an extra fee of 5,000, and his assistant, Herr Bücking, received 750. —Leipzig is to have a central electric-light system. It is high time, considering there are already 800 engines working for different parties, with together 42,000 incandescent lights and a large number of arc lights. Messrs. Siemens & Halske, of Berlin, will have the contract.

MISCELLANEOUS.

SURVEYORSHIP APPOINTMENT.—We understand that the name of Mr. Herbert J. Thurgood, F.S.I., of 27, Chancery-lane, has been added by the Board of Trade to their list, from which selection is made when it falls to the Board to appoint a surveyor to act in substitution cases.

SLAUGHTER-HOUSES, &c., ALNWICK.—On the 21st ult. Colonel C. H. Luard, R.E., held a Local Government Board inquiry with reference to the proposal to borrow 450l. for the erection of additional slaughtering, &c., accommodation at the public slaughter-houses at Alnwick, in accordance with plans prepared by Geoffrey Wilson, Town Surveyor. Colonel Luard also, on request, inspected the Fire Brigade Station and appliances, and said he would report to the Local Government Board as to the proposed loan of 200l. for the purchase of a new Brigade manual-engine, canvas and rubber-lined hose, &c.

THE "LANDS" BAND-SAW.—A trial of this new band-saw was made last Tuesday, with very satisfactory results. The saw-blade, which is 38 ft. long, 5 in. wide, and runs horizontally at 7,000 ft. a minute, is carried by two wrought-steel pulleys of

special construction, 5 ft. in diameter. No india-rubber or other substance is used on the surface of these pulleys, the saw-blade running on the metal rim, with the teeth projecting sufficiently beyond the edge of the pulley to clear the set. The saw pulleys are carried on a strong horizontal casting, furnished with the necessary adjustment for altering the distance between the pulleys to suit saws of different lengths, and to vary the tension on the saws. The casting on which the pulleys are carried rises and falls on two large screwed vertical columns, which are made to rotate by self-acting gear for the purpose of varying the height of the saw. The position of the saw is indicated by a disc immediately facing the operator, the whole control of the machine being immediately within his grasp, without his having to alter his position. It is claimed for this machine that it is a better and more rapid board-sawing machine than any other in the world, and that it will satisfactorily carry out certain operations hitherto looked upon as impossible on the band-saw.

PROPERTIES FOR SALE.—The Dancesfield Estate, Bucks., situated between Marlow and Henley, where the overgrown ruins, locally known as Dances' Ditches, near the church, of what may have been Hugh de Bolebe's house, are by some considered to be remains of a Danish fort. Here is the Catholic church designed by A. W. Pugin. The sale comprises the old Manor House of Bockmer, once a seat of the Bockmer family, and the Manor of Medmenham, with its Abbey of late years a riverside hotel. Dugdale records that Medmenham Manor was held, at the time of Domesday, by Hugh de Bolebe, whose younger son, Hugh, founded the Cistercian Abbey at Woburn, to which he made Medmenham a cell. Bolebe's inheritance passed in turn to the De Veres, Earls of Oxford, the De Warrenes, the Despencers, and other ennobled houses, and for longer than two hundred years belonged to the Duffields. Dugdale rehearses King John's Charter (1200) to Medmenham, which, in 1536, was annexed to Bisham, then having only an abbot, John Talbot, *ex-officio* Epistolar to the Order of the Garter, and one monk, Guy Strenshill. Browne Willis (1718) describes the ruins as consisting of a chapel, a wall-tiled building paved with brick, built since the Dissolution, and the outer walls with four piers of the north aisle. The ivy-clad tower, cloister, &c., are comparatively modern, having been erected as "ruins." Here, we need hardly add, the "Monks of St. Francis" held their misrule, under the presidency of Wilkes, Churchill, Robert Lloyd, Bobb Dodginton, and kindred spirits, though, *teste* one of their number, Dr. Bates of Little Missenden, they scarcely deserve the ill repute ascribed to their gatherings. —Lady Place, Hurley-on-Thames, once a Benedictine priory, replaced by a residence four hundred years ago, which was rebuilt in 1837. It is said that some subterranean chambers in the garden were used for a meeting-place by leaders of those who sought to bring about the Hanoverian Succession. —Carshalton Park, its mansion called "Mascalls," which Sir Edmund Hoskins sold, 1666, to Sir William Scaven, who had risked nearly all his large fortune in the cause of William III. His nephew and heir, Thomas Scaven, employed Leoni to design for him a magnificent seat, which, however, was not erected. Leoni published his drawings for the house in his work upon the architecture of Leo Baptist Alberti. Manning and Bray (1809) say the hall contains a chimney-piece brought, reputedly, from Nonsuch. The park, about two miles round, has of late years been the home of the Aitken family.

THE "FRENA" CAMERA FOR ARCHITECTURAL PHOTOGRAPHY.—The special advantage in this hand-camera is that the heavy, brittle, and bulky glass plate is abandoned, and the views are taken on flat celluloid films, notched on two of their edges in a peculiar way to facilitate changing after an exposure, and bringing a new sensitive surface into position for a fresh picture. These films are treated before and after development, precisely as glass negatives, in fact they are coated with the same emulsion. The magazine takes forty of these films, packed like cards—quite sufficient for several days' work—and they can be forwarded through the post, after exposure, without fear of breakage. Not so the old glass negative, for who would trust theirs to the tender mercies of the Post Office people, even when protected between stout boards, to say nothing of the weight of a dozen in any particular size. The special feature of the camera itself is the swing-back, an arrangement devised to restore the verticality of upright lines, so often inclining fondly inwards towards their fellows, as seen in many an amateur's snapshots of architecture. The reason of this is, that, in order to preserve the vertical lines of an object parallel in the picture, one has to keep the sensitive plate or film truly vertical. This becomes a difficult task when pointing the camera upwards at a slight angle, in order to take into the view a building of even average height. Hence the ingenious arrangement in the apparatus under consideration, where a little spirit-level attached to the handle of the swinging mechanism indicates the true position of the swing-back. In conjunction with this, too, is an automatic counter, which indicates the number of exposures made as each new film comes into position. Two finders are provided, which show on a reduced scale the image focussed on the sensitive surface; also,

an excellent lens (except that, in our opinion, the focus is a trifle too short—viz., 5½ in.), and a shutter which gives at will the briefest as well as the most lengthy exposure demanded by the lighting of the object. The whole apparatus is excellently finished, and for its price as good as any in the market. It will be found a useful companion by many a student of home and foreign work, and, having been devised by one who knew the special requirements of a camera and lens suitable for architectural record, its capabilities are far in advance of the ordinary commercial article, while in the hands of a skilled worker it leaves nothing to be desired. The "Frena" is made by Messrs. Beck & Co., of Cornhill.

THE '91 ART CLUB.—This Club will hold its Annual Exhibition of Members Works, at the Egyptian Hall, about the end of June.

LEGAL.

DISPUTE AS TO AN IRON BUILDING AT LINDFIELD:

IMPORTANT CASE.

THE case of Badley v. the Cuckfield Union Rural District Council came on the 20th ult. before a Divisional Court of the Queen's Bench, composed of the Lord Chief Justice and Mr. Justice Charles, their Lordships delivering a considered judgment on Wednesday.

The case came before the court on a special case stated, by consent, for the opinion of the court, and the facts were as follows:—The plaintiff, Mr. J. H. Badley, was the lessee for a term of years of a house known as "Bedale" and grounds of 30 acres, situated at Lindfield, in the defendants' district, which he used as a boarding-school for boys. By an order of the Local Government Board, dated October 14th, 1889, the provisions of sections 157 and 158 of the Public Health Act, 1875, were declared to be in force in that portion of the district in which the plaintiff's premises are situated. The defendant's predecessors, the Cuckfield Union Sanitary Authority, made certain by-laws which were allowed by the Local Government Board on November 1, 1883, and are still in force in the district. On January 21, 1895, the plaintiff, desiring to construct a sanatorium in connexion with his school, caused a notice to be sent to the Surveyor of the Council, under By-law 92—a notice of his intention, and a plan of the proposed building, which, it was stated, was to be put on brick foundations, with concrete floors, concrete under all wood floors, galvanised iron outside and lined with wood inside, and iron roof. The defendant's signified their disapproval of the intended building by notice, signed by the Surveyor, but the plaintiff, notwithstanding such disapproval, had commenced to put up the sanatorium with sheets of corrugated iron one thirty-second of an inch in thickness, with a layer of felt inside, three-sixteenths of an inch in thickness, fixed to the outside of a framework of wooden upright and horizontal posts and rails, the sheets being fixed to each other where they joined by rivets or other metal fastenings. To the inside of the framework was fixed a lining of match-boarding, five-eighths of an inch in thickness, and separated from the felt lining by a hollow space of 4½ in., being the thickness of the posts and rails. The defendants then gave notice to the plaintiff to pull down the work, and in default of his so doing, they were proceeding to pull down the same, when the plaintiff took action to restrain them, and after some negotiations an agreement was come to in order to get the opinion of the Court on a special case, raising the point in dispute between the parties, the plaintiff and the defendants consenting in the meantime to allow the building to remain in the condition in which it was at the time of the plaintiff's commencing the action. The points for the decision of the Court were—(1) Whether the defendants' by-laws prohibited the erection of the plaintiff's proposed building, and (2) if so, whether to that extent the by-laws were unreasonable. The plaintiff contended, in the first place, that the by-laws did not forbid the erection of such a building as the one in question, and that if they did forbid it, they were so far unreasonable and bad.

Mr. Rowlatt appeared as counsel for the plaintiff, and Mr. A. Glen for the defendants.

Mr. Rowlatt submitted to the Court that the Local Authorities' by-laws did not apply to corrugated-iron buildings at all. By-law 11 provided:—"That every person who should erect a new building should cause such building to be enclosed with walls constructed of good bricks, stone, or other hard and incombustible materials, properly boarded and solidly put together with good mortar (compounded with good lime and clean sharp sand) or other suitable material, or with good cement, or with good cement mixed with clean sharp sand." He said that that would be practically a prohibition of iron buildings altogether, which he submitted was never intended by the legislature.

Mr. Glen said that it was necessary for him to state the view that this was the ordinary iron buildings altogether; but the building in question was not really an iron building, but was a building with a thin outer coating of iron lined with matchwood, and was highly combustible. On being pressed by their Lordships the learned counsel said

that he should contend that a building such as the Plaintiff's was absolutely prohibited by the by-laws. The Lord Chief Justice, in giving judgment, said the case raised a somewhat intricate, and at the same time important, question upon the construction of by-laws of local authorities relating to the construction of new streets and new buildings, which by-laws had been approved of by the Local Government Board as far back as 1883, and appeared to have been in operation ever since that time. The question arose in this way. The plaintiff having certain property within the jurisdiction of the authorities was minded to erect a sanatorium in connexion with the property known as Bedale, and on January 21, 1895, he wrote to the Local Authorities stating that he proposed to build in connexion with his establishment a sanatorium, consisting of brick and cement foundations, and walled with corrugated iron supported by posts and rails and lined with match boarding, and he hoped the plans, which he at the same time submitted, would be found correct. They were, it appeared, not found correct, and the Authorities declined to sanction them. It had been agreed to submit a special case to the Court on the point in dispute, and the question for the Court was whether or not the Local Authorities were justified in refusing their consent to the erection of the building, and that depended upon the construction of the by-laws. Knowing, his Lordship said, how common it was to erect buildings in various parts of the country, including buildings, in which persons were intended to reside, composed of an outer wall and roof of iron, made in the same way as the building in question, it seemed to him remarkable that there did not appear to be any by-laws or regulations referring specifically to such buildings, but there being no rules dealing specially with these buildings the Court had to decide whether in fact the existing rules did cover the case of such buildings. The rule or by-law specially relied upon by the Local Authority was Rule 11, which provided that every person who shall erect a new building shall cause such building to be enclosed with walls constructed of good brick, stone, or other hard and incombustible materials, properly bonded, and solidly put together with good mortar, composed of good lime and clean sharp sand, or of cement. The explanation following obviously only applied to brick or stone walls, and had no proper application to the case of iron buildings. The Court had to ask itself whether the early part of this by-law referring to the construction of the walls applied to the present case, and, if so, whether the rule had been complied with by the plaintiff. To begin with, the wall was not constructed of bricks or stone, but the rule contemplated that, if not of brick or stone, the wall must be of "other hard and incombustible materials." Concrete would be such a material, and so, no doubt, would iron, under certain circumstances, but what they had to ask themselves was whether the wall as built by the plaintiff was constructed of incombustible materials, and this raised the question, "What is a wall?" He did not purpose to give an elaborate or exact definition of a wall, but he supposed he should be right in concluding that it must be something which would stand by itself, and, if so, it would not be made of corrugated iron, only the thirty-second part of an inch in thickness. Therefore the plaintiff's wall did not satisfy that test of what was a wall. The plaintiff's wall, it appeared from his own description, was constructed of an outer sheet of corrugated iron, supported by wooden posts and wooden rails. The outer sheet of iron was only one-thirty-second of an inch in thickness, and certainly would not of itself stand alone, and the wooden framework by which it was supported, being of wood, could not certainly be said to be hard and incombustible material, and if he took into consideration the matchwood lining the case for the Local Authority was strengthened. Therefore he must hold that the wall was most distinctly not a wall composed of brick or stone or "other hard and incombustible material." Therefore he was of opinion that the wall as constructed was an offence against the by-law, and could not be permitted.

Mr. Justice Charles concurred. Judgment was accordingly entered for the defendants—the Local Authority—with costs.

Counsel for plaintiff: Mr. L. M. Long, the plaintiff proposes to take out the wooden posts and to substitute iron. In that case, would your Lordships say—?

The Lord Chief Justice: We have answered one conundrum, and we don't want another propounded to us just now. You must be satisfied for the present with the answer you have got.

BOWN v. BAXTER:

AN ARCHITECT'S CHARGES AT HARROGATE.

THE arbitrator, Mr. A. P. Longstaffe, barrister, has made his award in the case of Bown v. Baxter. The action was brought by Mr. Arthur Bown (trading as Henry Edwin & Arthur Bown) of Harrogate, architect, against Mr. William Henry Baxter, engineer, carrying on business at Leeds, and residing at Knappington-mount, Harrogate, to recover the sum of 179l. 7s. for professional charges for work done by the plaintiff as a surveyor and architect for the defendant, and for money paid by the plaintiff for the defendant in connexion with the

erection of the defendant's residence and stables at Harrogate. By the defence the defendant disputed his liability to pay the plaintiff's claim, and set up a counter-claim against the plaintiff for damages sustained by him (the defendant) by reason of alleged negligence and unskilful and improper services in the erection of the defendant's residence. The case was set down for trial at the last Leeds Assizes, but on being reached an order was made by consent that the claim and counter-claim should be referred to Mr. Longstaffe as arbitrator, and that the costs of the action and counter-claim should follow the event, and the costs of the reference and award should be in the discretion of the arbitrator. Soon after the date of the order of reference, and before the hearing of the arbitration, Mr. Baxter's solicitors gave notice that he would offer no evidence and that he would rely solely on his counter-claim. The reference was held at the Queen's Hotel, Harrogate, on Wednesday and Thursday, May 1 and 2, and then adjourned to the Queen's Hotel, Leeds, until May 4, 1895, when it was concluded. Mr. Charles Mellor, instructed by Mr. T. Laycock, solicitor, Harrogate, appeared for the plaintiff; Mr. A. W. Barstow, instructed by Messrs. Ford & Warren, solicitors, Leeds, appeared for the defendant. Expert and other witnesses—viz., contractors, workmen, &c.—were called on behalf of the parties, and the arbitrator took time to consider his award, which he has now made. He finds that there is due to the plaintiff the amount of his claim—viz., 179l. 7s., and that the defendant has sustained damages for which the counter-claim was brought to the amount of 244l. 16s. 10d., and he directs that the plaintiff do pay to the defendant 65l. 9s. 10d., the difference between the two sums, and directs that judgment be entered for the defendant for that difference, and that the plaintiff should pay the defendant's costs of the reference and the costs of the award and bear his own costs of the reference.—*Leeds Mercury.*

CAPITAL AND LABOUR.

THE LONDON BUILDING TRADES.—Under the auspices of the London Building Trades Federation a meeting of members of all sections of the federation was held on the 26th ult. at the St. Pancras Arches, King's Cross, "for the purpose of considering the attitude of the master builders in the present crisis." Mr. J. Moore (Carpenters' and Joiners' Union) presided. Mr. W. Geard (United Builders' Labourers' Union) said that the building trade throughout the Metropolis was passing through a crisis which threatened at any moment to assume a serious aspect. The attitude of the masters with reference to the many questions at present in dispute would undoubtedly precipitate matters. The Masters' Association had given notice that after a certain date, piece-work, which had always been a vexed question in that particular industry, should be again introduced. Although the time had expired, the masters had deferred the matter until June 1, in order to give the London workers engaged in the building trade an opportunity of deciding either one way or the other. The men had decided, by an overwhelming majority, against any alteration of the agreement arrived at in May, 1892, but still the employers were determined that the proposed change should come into operation on June 1. The Federation, however, was determined to resist this alteration, which meant a renewal of the slavery and injustice which characterised the building trade prior to the year 1892. Mr. W. Kern (Operative Bricklayers' Society), Mr. J. Phillips (Bricklayers' Society), and Mr. W. Bowman (Carpenters' and Joiners' Union), having addressed the meeting, a resolution upholding the action of the Federation during the present crisis was carried.

THE STRIKE IN THE LEICESTER BUILDING TRADES.—Although the strike in the Leicester building trades is in its ninth week as regards the carpenters and joiners, there is no prospect of a settlement. The plumbers are still locked out, and they decline to resume on the terms offered. The builders, bricklayers, plasterers, and slaters have declined to accede to the demand for a general strike; but all building operations are being seriously interfered with, and the employers threaten to introduce non-union labour.

THE STRIKE IN THE BUILDING TRADE AT STOURBRIDGE.—This strike still continues, and though the men have had a communication from the masters with an offer, it does not, it is stated, meet what the former want—viz., the fixing of a standard rate of wages for the Stourbridge district of 8d. per hour.

MEETINGS.

FRIDAY, MAY 31.

Sanitary Inspectors' Association.—Visit to Worthing.

SATURDAY, JUNE 1.

Sanitary Inspectors' Association.—Visit to Worthing (concluded).

MONDAY, JUNE 3.

Glasgow Architectural Association.—Mr. W. J. Anderson on "The Early Development of the Christian Church." 8 p.m.

TUESDAY, JUNE 4.

Institution of Junior Engineers.—Visit to the Waterloo and City Railway Works. Entrance, Upper Ground-street, Blackfriars, S.E. 6 p.m.

WEDNESDAY, JUNE 5.

Royal Archaeological Institute of Great Britain and Ireland.—(1) Paper by Mr. J. L. André, F.S.A., entitled "Antiquarian Notes on the Rose"; (2) The Rev. Canon Raven, F.S.A., on "The British part of the Itinerary of the Provinces, called Antonine's Itinerary." 4 p.m.

British Archaeological Association.—Closing meeting of the season. Paper by Mr. Walter Money, F.S.A., entitled "A Walk to Shireburn Castle, and the Itinerary of the Provinces, called Antonine's Itinerary." Ordinary meeting of the Members. 8 p.m.

SATURDAY, JUNE 8.

Liverpool Engineering Society.—Excursion to the Liverpool Corporation Reservoirs and Filter Beds at Rivington. Mr. J. Parry, Water Engineer.

RECENT PATENTS:

ABSTRACTS OF SPECIFICATIONS.

9,235.—DRAIN-PIPE: A. Turley.—An improved drain or sewer-pipe which consists of a pipe having a socket cast half way round the circumference at each end, such half-sockets being cast upon opposite sides of the pipe, so that when two pipes are connected a complete socket runs around the joint.

11,786.—WINDOWS: S. Taylor.—Relates to the forming of grooves in the head, stiles, and sill of casement-windows to receive round-nosed fillets, secured to the framing, thus preventing the entrance of wet, draughts, &c.

12,753. CRAMPS: J. Hampton and another.—Consists of improvements in flooring and mitre cramps. The frame of the cramp is constructed as follows:—A tubular case, in which the cramping bar works, has on one side a depending plate, which constitutes the fixed jaw of the jointing plate, and on the other side a depending bracket, through which the screw of the movable jaw of the jointing plate works. The clamping-bar, which has motion at right angles to the screw of the joint-clamp, has a toothed rack, and is operated by means of a lever and pinion. The return motion of the cramping-bar is prevented by a pawl pivoted on the outside of the case, which engages with a ratchet-wheel fixed to the same axis as the pinion. In mitre-cramps intermediate uprights are employed for supporting the strips at points where they are gripped by the movable jaw.

3,991.—PLATE STAND: L. E. Wood and another.—Deals with methods for providing an efficient plate or tray stand for fireplaces. A number of strips of metal are laid over each other obliquely, and loosely riveted together, so as to form an oblong rack which can be contracted or extended laterally as desired. Upon the under side, strips are placed for support, and at one end slots are made to receive bolts for attaching the rack to a fender or fire-guard.

5,356.—WINDOWS: J. de Long.—A device designed to attach to windows for ventilating apartments. Consists of an arrangement comprising two slotted cleats, each provided with an outwardly projecting spring tongue, and a sloping plate having a narrow flexible projecting lip at its lower edge, and a wide flexible lip near its upper edge, arranged to bear against the lower rail of a sash. The cleats are secured to the sides of the window-frame near the sill, and close the opening beneath the lower sash when the window is raised, thus preventing a direct draught.

5,497.—WATER PIPES: J. Mark.—To prevent bursting of water-pipes during frost, a tube of smaller diameter is inserted, through which hot air or water is conveyed.

5,498.—SCAFFOLDING: L. Higgins.—A device for use in connexion with ladders for supporting scaffolding. Two parallel ribs are connected in the same plane, at a suitable distance apart by stays. A straight bar is hinged at one end to the upper stay, and at the other end to a circular-shaped piece of metal which is free to pass through a slot in the lower stay, and is used for supporting and adjusting the bar to the slope of the ladder by means of a pin which fits into a series of holes in the quadrant. The scaffolding rests upon the bar, which can thus be placed at any angle, and the whole is suspended from the ladder-stave by the stays.

3,619.—WINDOWS: J. Corn.—An arrangement whereby sliding-windows may be swung into the room, consists in forming an intermediate stile of wood or iron, and pivoting same to the upper part of the window-frame.

NEW APPLICATIONS FOR LETTERS PATENT.

MAY 13.—9,416, T. Godfrey, Sliding Windows.—9,421, A. East, Clutch for Lifting Stone.—9,443, P. Bright, Water-closets.

MAY 14.—9,468, J. Jones, Brick-making Machinery.—9,491, J. Meyers, Angle Grip for Sash Frames.—9,502, E. Beech, High-pressure Boilers, &c., to Prevent Bursting from Frost.—9,527, A. Bouet, Doors.—9,543, J. Wanck and J. Pap Von Lohs, Door-fasteners.

MAY 15.—9,600, R. Eck, Wood-working Machinery.—9,608, B. Hodges, Saw-frames.

MAY 16.—9,669, J. Watt, Siphon Flushing Cisterns.—9,678, W. Boll, Attaching Handles, &c., to Spindles, &c.—9,714, W. Wise, Glass Plates.

MAY 17.—9,766, W. Appleford, Flushing Apparatus for Water-closets, &c.—9,805, D. Brighton and E. Venning, Drain and other Metal Pipes.

MAY 18.—9,825, T. Sabine, Sockets of Pipes for Drainage, &c.—9,836, G. Brookes, Window-fasteners.—9,891, H. Gregory, Sulphate of Lead and Lead Pigments.

PROVISIONAL SPECIFICATIONS ACCEPTED.

6,631, W. Willis, Flushing Cisterns.—8,122, J. Jeffreys, Ventilating Fans.—8,431, J. Morgan, Sash Fasteners.—8,502, M. Ferguson, Fire-grates.—8,602, J. Mulligan, Ventilators.—8,679, R. Elson, Door Fastener.—8,707, H. Darwin, Fittings for Doors, &c.—8,915, H. Flemming, Varnish.

COMPLETE SPECIFICATIONS ACCEPTED.

(Open to Opposition for Two Months.)

9,455, R. Hauer, Preservation or Treatment of Building Structures, Building Materials, and the like from Dirt and Decay.—12,383, M. Ahern, Glazing and Enamelling Bricks, &c.—13,292, T. Twyford, Water-closets.—13,607, R. Ardagh, Wooden Blocks for Paving and Flooring.—13,617, W. Ingham and B. Langham, Case and Spring for making Sockets in Sanitary-pipes.—7,676, J. Riegl, Lever Clamp.

TENDERS

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays.*]

TENDERS

ABERSYCHAN—For the execution of bridge works for the Urban District Council. Mr. E. Cooke, Surveyor, Council Offices, Abersychan.—

A. M. Scott	£293	0	0	W. & A. Davies.....	£233	0	0
Baker & Co.	285	0	0	Finch & Co.	'33	0	0
Dyne, Steel & Son ..	266	18	6	Parkinson Chapman,			
Thomas Bennett & Co.	246	0	0	Pontypool*	232	1	0
William Jones	235	0	0				

Accepted.

ABERTILLERY (Mon.).—Accepted for laying a 6-in. water-main, Blaenau Gwent to Royal Oak Inn, Llanhilleth, for the Urban District Council. Mr. J. McBean, C.E., 1, King-street, Aberdillery. Quantities by Engineer.

Hy. Groes, Llanhillth, Mon. £800

BECCLES.—For converting old chapel, Peddar's-lane, Beccles, into dwelling-house, erecting new outbuildings, and relaying drains, &c. Mr. Arthur Peels, architect :—

BECCLES.—For new business premises for the Beccles Workmen's Association, see p. 12.

Men's Co-operative Society, Mr. Arthur Pells, F.S.I., architect,
Bucks.—
Hundes £2,490 [J. Youngs & Son, Norwich
G. E. Hawes 2,000 (accepted) £2,000
[Surveyor's estimate, £2,150]

BELPER.—For additions to the school (Pottery), for the School Board. Mr. S. R. Bakewell, architect, Belper. Quantities by the architect:—
 Wheeldon Bros. £62 Rodell & Son £590
 A. Hugley 600

BIRMINGHAM—For the erection of the Church of St. Mary and St. John, George-street, Balsall Heath, for The Very Rev. John P. Dowling, M.R. Mr. Albert Vicars, architect, Somerset Chambers, 151, Strand, London. —

Willcox	23-075	Monat.....	23-204
Rowbottom	3-366	Harley*.....	3-12
	3-246		* Accepted.

BRIDLINGTON QUAY
(Yorks.).—For the erection of a corn mill, for Mr. W. T. Lawson. Mr. I. Farnham, architect, Witham.

TIMBER (contd.)

Walnut, Italian...

META

on—Plg, in Scot
land for

CARDIFF.—Accepted for the erection of chimney-stack, 120 ft. high, at Messrs. Spillers Nephew's biscuit factory, Cardiff. Messrs. Veall & Sant, architects:—

Thacker, & Co., Ltd. Messrs. J. P. Jones, Richards, & Budgett and Charles C. Jones, architects, Cardiff:—	
Stephens, Bastow, & Co., Ltd.	Lattey & Co. £12,898
Knox & Wells 13,105	E. Turner & Sons, Car. diff. 72,648
Henry Davies 12,287	A. Berridge 12,458
James Allan 12,000	

Eastwood, Bros.,	1,321	2	10	H. Barraclough	1,169	11	8
J. P. Speight.....	1,444	14	3	Thos. Lane, Lincoln*	1,162	13	
A. Brunton & Son	1,214	5	3				

* Accepted.

CORK.—For the extension of schools and offices. Presentation

Heating Apparatus.

D. O'Connell, Cork *. £58

* Accepted.

[All of Cork.]

I.F.I.G.H. (Salop).—For new house at I Figh, near Munsterley, (the Hon. and Rev. J. R. O. Bridgeman, Mr. H. I. Beckwith architect, 3, Cook-street, Liverpool:—
Bowlster & Co. £2,300 Treasure & Son, Shrews-
E. Whittingham 2,174 bury* £2,474
* Accepted.

SWANSEA.—For rebuilding market, Oxford street, for the Town Council. Messrs. J. B. Williams & Co. Architects, 15, Castle Street, Swansea. Quantities by architects.

J. B. Williams .. 12,424 0 0
J. B. Williams .. 12,424 0 0
J. B. Williams .. 12,424 0 0

SWINDON.—For the erection of school buildings, Clarence-street, for the School Board of Swindon. Mr. W. Drew architect and surveyor, Swindon. Quantities by architect.

Benfield & Loxley .. 6,774 0 0
D. C. Jones & Co. .. 10,747 0 0
J. Long & Sons .. 10,747 0 0
K. J. Leighton .. 10,747 0 0
H. A. Paine .. 9,805 0 0
H. Flewelling .. 9,805 0 0

WATFORD.—For alterations to the Workhouse, for the Carlians.

Brighman .. 3,479 0 0
Neal .. 3,479 0 0
Waterman .. 3,479 0 0

WATFORD.—For the erection of five villa-residences for Mr. T. Long. Mr. T. F. Shaw, Haselden, architect.

Darlington .. 3,380 0 0
Gordon & Sons .. 3,380 0 0
Read .. 3,380 0 0
Brighman .. 3,380 0 0
Neal .. 3,380 0 0

WIST BRIDGE ROAD, NORTH.—For additions to National School buildings, for the Rector and Committee of West Bridgford Schools. Mr. N. Holloway, architect, 5, Bridgeford-road, Nottingham. Quantities by architect.

W. J. H. H. .. 3,380 0 0
W. J. H. H. .. 3,380 0 0
W. J. H. H. .. 3,380 0 0

WITLEY.—For extensions to Chapel of St. Vincent, Great Witley, Surrey. Messrs. J. B. Williams & Co. Architects, 15, Castle Street, Swansea. Quantities by architects.

Albert .. 4,410 0 0
Albert .. 4,410 0 0
Albert .. 4,410 0 0

The Wills and Sons, Ltd.—In our last issue, page 401, in the list of ten letters for the Wills and Sons Bank at Bristol, we gave the names of the architect and quantity surveyor respectively as Lilly and Purkey. These should have been G. M. Silley and F. M. Lacey. The error is not ours.

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The Builder.

VOL. LXVIII. No. 2721.

JUNE 8, 1895.

ILLUSTRATIONS.

Northampton Institute, Clerkenwell.—Mr. E. W. Mountford, F.R.I.B.A., Architect	Double-Page Ink-Photo.
Design to which the Tite Prize, 1894, was awarded.—By Mr. R. Shekleton Balfour, A.R.I.B.A.	Double-Page Photo-Litho.
Badsworth Grange, Yorkshire.—Mr. C. J. Ferguson, F.S.A., Architect	Double-Page Ink-Photo.
A House at Oxted.—Mr. H. Redfern, Architect	Single-Page Ink-Photo.
Design for a Small Country House.—By Mr. A. A. Gibson	Single-Page Ink-Photo.

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Old Thatched Cottage, Paddington	Page 435
French Ironwork of the Late Renaissance Period (five examples)	Pages 431, 432, 433

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Delphi.



FROM time to time during the past three years we have drawn attention to the progress of the French excavations at Delphi, but for any more systematic account it has been necessary to wait for two things—first, the issue of a plan of the excavations; and, second, the opportunity for visiting Delphi in person and studying on the spot the topography of the site, the ground-plans of temples, treasures, and votive offerings, and the sculptured and architectural monuments now stored in the local museum. It was our exceptional good fortune to visit Delphi in company with the Director of the French School, M. Homolle, and to hear from his lips his views as to the date and interpretation of the various buildings he has discovered. These views have been in the main laid before the public abroad in various conferences held at the French School at Athens and elsewhere, and are in part also published in recent numbers of the *Bulletin de Correspondance Hellénique*,* so we violate no confidence in placing them at some length before our readers. That the nation which discovers should be the first to publish is the most elementary rule of archaeological etiquette; we are unable, therefore, at present to offer any reproduction of the as yet unpublished photographs of the sculptures discovered, but we are able to reproduce the plan of the excavations, hitherto accessible only in foreign journals.

* It may be well at this point to indicate the literature already considerable, that has grown up round the Delphi excavations, and to which the writer of this article owes much. First in importance come the official reports issued by M. Homolle himself in the *Bulletin de Correspondance Hellénique*, the organ of the École Française at Athens. From the bulletin is taken the plan reproduced here. Two articles of a more popular character by M. Homolle have appeared in the *Gazette des Beaux Arts*, 1895, for February and March, and one somewhat more technical in the *Académie des Inscriptions et Belles Lettres Séance*, November 16, 1894. At a conference at the French School on March 6, M. Homolle gave an address on the results of the excavations collectively, and, on March 20, he discussed the sculptures of the Siphnian Treasury. Of this last address a summary appeared in the *Berliner Philologische Wochenschrift*, April 27. In the same periodical Dr. Fortwängler, 1894, p. 1, 276, and Dr. Beiger, 1894, p. 863, have given their personal impressions. Last, but not least, we owe much to Dr. Pomtow's discussion of the relation of the discoveries to the narrative of Pausanias, in a paper read before the Berlin *Archäologische Gesellschaft*, and reported in the *Anzeiger*, 1895, vol. x., Heft 1, p. 2.

To anyone who visits Delphi the first impression is of loss, the inevitable loss of the picturesque; old Kastri, the village that used to poise so beautifully in the steep slope, is gone for ever to make way for a Decauville railway, the bareness of freshly upturned earth, and a few dismal-looking ground plans. But let him once set his foot upon the Sacred Way, and regret is lost in a new and keener interest.

We must strictly limit our account by the plan before us (drawn up by the engineer, M. Couvert, on a scale of 1:500), and follow the Sacred Way just so far as it takes us—no further—*i.e.*, from the beginning where it enters the precinct at the right hand of the plan to the Treasury of the Athenians, the last building sketched in. The Temple of Apollo is not included; at the time we visited the excavations, though the ground plan was substantially complete, the whole site was not quite cleared, so it must wait a future occasion for discussion. Our method will be—Pausanias in hand—to follow just this small section of the Sacred Way, and see how far we can compare, how far supplement his account.

Pausanias (x., 9 ff.) approaches Delphi from Daulis, and therefore enters the precinct from the east. At the entrance (*ἐκδοῦντι δὲ ἑς τὸ ῥήμιον*) stood, he says, a brazen bull by Theopropos of Ægina the offering of the people of Corcyra. The bull, by his bellowing, had brought a herdsman down to the sea, and showed him a large shoal of tunny-fish. The pious bull wrought for his own destruction, for the fish could not be caught till he was sacrificed to Poseidon. From the proceeds of the catch the people of Corcyra dedicated his brazen effigy. The basis of this votive offering has been found out *in situ*, but about a hundred metres higher up the Sacred Way, so that this gives us no topographical fixed point.

Any uncertainty, however, as to where Pausanias stands shortly and decisively disappears. Conspicuous in the plan N and S of the Sacred Way, close to the entrance, are two large semi-circular structures, marked respectively "Offering of the Argives, Kings of Argos" and "Offering of the Argives, the Epigoni." The southern of these two semi-circles was in part laid bare by M. Pomtow in May, 1887; the northern one was brought to light in May, 1894. Its substructure lies about a metre above the pavement of the Sacred Way; a substantial wall of large blocks of stone closes it round to the north. At the

foot of this enclosing wall is a low semi-circular step, bearing inscriptions. From right to left run the names of Kings of Argos—*Ἀβας Ἀρκίσιος Ἀντικτὸς Περσέης Ἡρακλῆς*, and in the ordinary direction, left to right, the name of the artist, Antiphanes of Argos. The difference in direction is no doubt due to the desire to give to the names of these ancient kings a venerable air. This monument M. Homolle believes to have been that seen and described by Pausanias (x., 10, 5). It was dedicated by the Argives who helped Epaminondas and the Thebans in the foundation of Messene. "On it were represented statues of heroes, and the succession of kings that traced their descent to Herakles, or, even further back, to Perseus." It is this row of kings' names that have come to light.

Opposite these statues (*καταντικρὺ*) stood, according to Pausanias, another group—*i.e.*, the statues of the "Epigoni," also erected by the Argives—and these must certainly have occupied the southern semicircle discovered by M. Pomtow. The importance of this conjoint attribution cannot be overestimated. It gives an absolutely fixed topographical point, and enables us to place with almost equal certainty a whole series of other monuments on either side of the way. To get this fixed starting-point we have gone on a little in advance, and must retrace a few steps to the monument marked "Offering of the Lacedæmonians." Here no inscription helps us, but the size of the monument, a chamber 25 mètres long (not fully drawn in on the plan), and the fact that its east end all but touches the precinct wall, points to two conclusions: the monument contained must have been of extensive size, and must have been seen by Pausanias immediately on entering the precinct. Only one monument fulfils these two conditions, *i.e.*, the pompous trophy of Lysander commemorating his victory over the Athenians at Aegisptamos. It consisted of no less than thirty-seven single statues by various sculptors, nine ranged in front, including Lysander himself crowned by Poseidon, behind them eleven statues of Spartans and their allies who fought at the battle, then another seven (*ἱππεῖς*), and yet another ten close at hand (*ἐχόμενοι αὐτῶν*). The general disposition of the chamber corresponds to this account. It opens on to the Sacred Way, and contains a large raised basis which appears to have been divided into several steps.

Opposite this Lysander monument (again *καταντικρὺ*), Pausanias saw a monument of

Arcadian kings and heroes offered by the people of Tegea from the spoils of the Lacedæmonians (369 B.C.), this was again the conjoint work of several artists, among them the Argive Antiphanes. Of this monument the basis, with inscription, was found by M. Pontow in 1887; it lay just inside the temenos entrance to the south side of the Sacred Way, and consists of a block of black calcareous stone, 1.30 metres broad. There are three inscriptions on the stone, but two are later additions, the one in letters of the fourth century B.C., and consisting of five distichs, is the dedicatory inscription proper. It is fully discussed by its discoverer in the *Mittheilungen* (xiv., p. 15). It seems probable that, as in the case of the Argive kings, the names of the persons represented in the statues were inscribed, and that Pausanias took his account rather from these inscriptions than from the dedication on the basis, which is cut in very small characters. The Arcadian monument, as not found *in situ*, is, of course, not marked on the plan, but it may safely be placed on the south side of the Sacred Way, immediately opposite the Offering of the Lacedæmonians. Since this last, as mentioned above, all but touches on the precinct wall, all other monuments seen by Pausanias before he came to the Epigoni must stand on the south side. There are (1) the bull of Theopropos; (2) the "wooden horse" of the Argives; (3) the Marathon trophy; (4) the "Argive" trophy after the battle of Oince; (5) the chariot of Amphiaraus.

Here we may pause for a moment to make a reflection in honour of Pausanias. Frequent efforts have been made to disparage his authority as an eye-witness—to make of him a mere compiler, and, in the matter of Delphi, mainly depending on Polemon. Walking along the Sacred Way marking how his adverbs and prepositions fit in on the spot, it is impossible for any sane person to doubt that he actually saw what he describes. Dr. Pomtow, who has done so much for the topography of Delphi, is the first to own this. Another valuable result is that the precise meaning of particular expressions in frequent use by Pausanias comes out with more certainty here than in any other part of his perambulations. It is a relief to know once and for all that here, and consequently on the Acropolis at Athens, *καταντικρύ* means not merely opposite, but, when there is a road in question, *on the other side*; that *ἐπὶ τῇ* and *παρὰ* imply immediate consecution on the same side; and *πλησίον* and *ἐγγύς* somewhat less immediate neighbourhood, but still on the same side. When a new sentence is begun without indication of connexion, it frequently, as Dr. Pomtow observes, indicates transition to the opposite side.

After the statues of the Epigoni the southern side of the Sacred Way is completely destroyed—on the north side its course can be clearly made out by various chambers, fragmentary walls and niches, but these are all of uncertain attribution. About 20 metres west of the Epigoni we come to a substantial fixed point, *i.e.* the *Treasury of Sikyonians*. Pausanias passes the building by, merely remarking that neither in this nor any of the Treasuries were there any "χαίματα" to be seen in his days. The excavations tell us more. Somewhat below the level of the Sacred Way the foundations in tufa were discovered of a building with the form, the usual form for Treasuries of a *templem in antis*. The substructure of the building rests at a great depth on solid rock, and consist of fragments of some older building, pieces of the architrave, drums of Doric columns, and remains of some circular buildings; on these are certain stone-mason's marks similar to that found in the foundations of the Theban Treasury, to be noted later. As this building is the first that occurs of the shape fitting to a Treasury, and as the Treasury of the Sikyonians is the first named by Pausanias, there can be little, if any, doubt that the attribution is correct.

In and about the foundations were found a number of metope sculptures in tufa, dating evidently about the sixth century B.C. The sculptures themselves are all painted mainly in red and black, the ground has at least preserved no trace of colour, the pose of the figures, the rigid gestures and stiff drapery all recall the manner of the black-figure vase-painters; so do the inscriptions that accompany the figures. M. Homolle states candidly that the inscriptions do not present the characteristic forms of the Sikyonian alphabet (*e.g.* $\Sigma = \text{E}$), nor are the myths represented in any way peculiar to or characteristic of Sikyon. Moreover the metopes are a little large and heavy for the proportions of the building, nevertheless, from the condition in which they were found it is impossible to entertain the supposition that they belonged to a previous building and were used up as old material. The subjects are as follows:—1. Idas and the Dioscuri bringing from Messenia the flock of captured oxen. The names are painted in black at the sides of the figures. Very curious, and decoratively very successful, is the pattern made of the manifold oxen legs. 2. A boar, probably part of a representation of the hunt of the Calydonian boar in which the Dioscuri took part. 3. Two horsemen seen *en face*, behind them a ship with warriors, of whom nothing remains but their bucklers, in the centre two figures playing on the lyre, near one of them the letters $\Phi \Lambda \Sigma$. The two horsemen are probably again the Dioscuri, and the scene may be taken from the voyage of the Argonauts. 4. A ram carrying a figure which must be Helle. 5. Curious and very archaic representation of Europa on the bull; she has the oddly compressed waist that appears on early black-figure vases, and she bends forward in an exaggerated pose.

Pausanias mentions the Treasury of the Sikyonians immediately after, a votive offering of the Tarentines, consisting of a group of horses and captive Messapian women by the Argive sculptor Ageladas; the Sikyonian was near this (*πλησίον*), so we must place the Tarentine group immediately west of the Treasury.

After the Treasury of the Sikyonians, and standing near to it (*παρὰ*) Pausanias mentions a group of statues dedicated by the Cnidians; they represented Triopas, the founder of Cnidos, standing near his horse, and Leto, with Apollo and Artemis shooting at Tityos, who is represented (as usually on vases) as wounded. These are the only monuments Pausanias mentions between the Treasury of the Sikyonians and that next in order, the Treasury of the Siphnians, so we must place them somewhere in the intervening space.

A few paces further to the west we reach the Treasury of the Siphnians. Herodotus tells us (iii., 57) that, about the time of the war against Polycrates, the affairs of the Siphnians were in a flourishing condition; "they were the richest of all the islanders, having in the island gold and silver mines, so that from the tenth of the money accruing from thence a Treasury was set up, equal to the richest." Pausanias, who saw the Treasury next after that of the Sikyonians, adds the further detail that the Treasury was built by order of the Delphic god, and that when in their greed the Siphnians neglected to send the annual tithe, the sea encroached and swept away their mines (P. x., 11, 2). The Siphnian Treasury stands impressively on a sort of rampart at the angle where the Sacred Way turns for the first time. It has the form of a temple with portico, and faces west, the only direction in which it is accessible. All round the Treasury were found not only the frieze and pediment sculptures to be noted shortly, but a number of architectural fragments amply sufficient to show that the decoration of the building was rich and delicate to no ordinary degree. The whole scheme can be reconstructed. The entire architrave was of Parian marble; above the sculptured frieze came a line of beading, massive and archaic in character;

above this a Lesbian cyma, of which many fragments are preserved. The cornice is richly decorated with a band of palmetta and lotus in relief, elaborately coloured, the colour still remaining with extraordinary freshness. Dr. Furtwängler draws attention to the fact that the decorative forms of these architectural fragments find their closest analogy in vases, not of Attic, Rhodian, or Chalcidian provenance, but rather in the hydrie of Cere, which are acknowledged to be Ionian in style. Such forms appear to have been very popular at Delphi. The cornice was further ornamented, though probably on the front façade only, with bossed phialai, the oldest examples of this popular form of decoration.

A building so elaborate and splendid would have been incomplete without sculptured adornment. Happily the frieze and the sculptures of one pediment have been found substantially complete; the sculptures of the west pediment are, however, entirely missing. They must have once existed, as the west is the principal façade and only entrance. By a most fortunate circumstance the sculptures of the frieze were found substantially where they originally fell, lying on all four sides of the temple, the corner slabs for the most part near the actual angles of the Treasury, so that the arrangement of the whole composition was a work of no very serious difficulty. The total length of the frieze was 28 metres, of which 20 have been found.

To discuss the details of the Siphnian Treasury without illustrations would be an unprofitable task, but a few words on subject and style may be allowed. And first it is noticeable that the technique of the pediment sculptures is distinctly more archaic than that of the frieze. The scene represented is the "Theft of the Tripod." Athens stands in the centre, and—as on a Chalcidian vase with the same subject—holds apart the two combatants, Apollo and Herakles. Behind Apollo are two women figures, Leto and Artemis; behind Herakles also two figures and his chariot. The arrangement is instructive for the history of pediment composition. The figures stand—as Dr. Furtwängler has well remarked, ranged like "organ-pipes," shortening towards either end; the actual angles were more than the artist could cope with, he leaves them unfilled—in fact, the composition is nothing, but a bit of frieze cramped into a pediment. The central figures present a curious peculiarity of technique; the upper parts are worked fully in the round, the lower simply treated as relief. M. Homolle explains this as intended to throw the upper parts into prominence, in order to counterbalance the shadow cast by the tympanum.

When the pediment sculptures are examined side by side with those of the frieze, as they stand in the museum at Delphi, the greater freedom and livelier motion of the frieze sculptures is at once evident. M. Homolle goes further. He sees in the frieze itself the work of two different artists—the slabs of the south and west sides from the older, those of the north and east to the younger hand. It is certainly noticeable that on the south and west slabs the relief shows but little modelling; like those of the pediment, the edges are cut square as in the well-known Sparta grave reliefs; on the north and east slabs they are more rounded. The composition, too, of these presumably later slabs is more complex.

From the point of view of subject, the whole frieze is a mine of mythological interest, and its value is the greater from the fact that nearly all the figures bear legible inscriptions—legible, *i.e.*, when they were first excavated, with letters painted red, some of which were written on the ground of the relief close to the figures, others on the band below the composition, as in the Pergamene altar. Originally, in all probability, every figure, and even the horses and some inanimate objects, had their names inscribed. Many of the inscriptions have disappeared altogether, some are now illegible, but



Plan of the Excavations at Delphi.—Scale 1:100.

sufficient have been clearly made out to place the subjects and most of the individual figures beyond dispute.

It was hoped at first that these inscriptions might settle the question of the school to which the sculptures belonged. This hope was doomed to disappointment, for inscriptions with letters of just the same form are found on the frieze of the Sikyonian treasury, and on the metopes from the treasury of the Athenians. M. Homolle now holds that the inscriptions were painted in at Delphi after the sculptures were set up, and this would explain the uniformity in the alphabet. They are, however, none the less valuable as a clue to the subjects.

These fall into four groups, corresponding roughly to the four sides of the building. On the front (west) façade we have the apotheosis of Herakles. The central slab is unfortunately lost. It may have contained an assembly of the gods. The angles are filled by two chariots turned cornerwards. Athens stands near one of these in the act, apparently, of inviting Herakles to mount the chariot. The horses are winged, and one of them is inscribed "Pegasos." Hebe (inscribed) stands near the other chariot. Near her Niké (inscribed), and a third figure.

Less certain is the position of the next important group, representing the preparations for the chariot race between Pelops and Oinomaos. A fragment from this portion of the frieze, containing a chariot, were found long ago. All the important male figures are inscribed, *i.e.* Pelops, Oinomaos, and Myrtilus, and between the chariots is an altar inscribed as "Altar of Zeus." This detail is of special interest in relation to Dr. Dörpfeld's conjecture that in front of the figure of Zeus in the Olympian pediment an altar may have stood. An altar gives point and emphasis to the scene, and occurs in vase-paintings wherever the contest is represented. The east side contains a Homeric context over a fallen warrior, inscribed Sarpedon. Menelaos also is inscribed, and Patroklos is evident from the fact that on his shield is written "of Achilles" (*Ἀχιλλεύς*). He is carrying the arms of his friend. The combat is watched by a number of gods on either side, as their sympathies are Trojan or Greek. Some are easily recognisable from their attributes—others, *e.g.* Nemesis must, but for these inscriptions, have remained uncertain. On the bosom of Zeus a hand rests, apparently of a suppliant; the figure is lost, but on the band below is inscribed *Θις Ἀχαιῶς μίτρη*. The seated gods are like some early prototype of the seated gods of the Parthenon, and the resemblance naturally struck the discoverers at first sight, but these archaic divinities are much livelier and keener in gesture; they have not yet attained the well-bred composure of the Parthenon Olympians.

On the north side, that facing the Sacred Way, a gigantomachia is depicted, and from this composition come some of the finest motives in the whole frieze. Fortunately here, too, inscriptions abound, and it is hoped some incidental light may be thrown on the still problematic figures of the Pergamene altar. Athene and Enkelados, Cybele and her lions, Dionysos with his kantharos helmet, Heracles with his lion-skin, need no inscriptions. One group, but that it is inscribed, might well have baffled interpretation. A bearded man, wearing a short chiton, stands close to a large pithos, over it he seems to place his open hand; with the other hand he is apparently closing a sort of leathern bag. An inscription tells us that he is Æolus, who appears here, for the first time we believe, in archaic sculpture. The pithos is probably the main store-house of the winds, from which, from time to time, the bag is filled as wanted. In the *Odyssey* (x., i.) we have no mention of a pithos, but *Odysseus* says "he gave me a wallet made of the hide of an ox nine seasons old, which he let flay, and therein he bound the ways of all the noisy winds." The pithos may stand as shorthand for the

island "surrounded by the wall of bronze unbroken."

About the question as to what school gave birth to these curious and sometimes beautiful Siphnian sculptures controversy has already commenced. We have no evidence that a school of sculpture ever existed on the island itself. Herodotus tells us that the Siphnians possessed a market and a prytaneion of Parian marble, and the frieze is of that material. The architectural decorations of the building are archaic Ionian, but the style of the sculptures is not wholly what we associate with Asia Minor. Dr. Furtwängler does not hesitate to attribute the Siphnian sculptures to a Parian artist. M. Homolle inclines to see in them Argive influence, and he rests his argument, in part, on the evidence of epigraphy. On the shield of one of the giants an inscription occurs with the Argive lambda. The heavy proportions of the figures seem to point to Peloponnesian tradition, the choice of subjects, *e.g.*, the contest of Pelops and Oinomaos; and the prominence given to Menelaos may look the same way, but the question must await the full publication of the sculptures.

Immediately after the Treasury of the Siphnians Pausanias mentions statues set up by the inhabitants of Lipara after a naval victory over the Tyrrhenians. The site of these is not marked on the plan, but just at this spot an inscription has been found belonging to a votive offering from Lipara (*Bull. de Cor.*, c. xvii., p. 614).

So far the Sacred Way has run steadily at a moderate incline in a direction almost due west. It now turns at right-angles to the north, and climbs upward by a series of steep steps for about 13 metres, and there meets the elevated terrace of the Treasury of the Athenians, our present goal. Just opposite where the road turns, and on its left side, we come to another building—the Treasury of the Boeotians.

At this point Pausanias becomes topographically somewhat vague. Immediately after the Lipara monument he says, but with no topographical indication, that "the Theban Treasuries resulted from the victory of Leuctra as the Athenian from the battle of Marathon." He then goes on to mention the Treasuries of Syracuse and Potidaia, and the circumstances of their founding; these two last have not, so far, come to light. Fortunately as to the Boeotian Treasury there is no doubt. A number of blocks were found covered with inscriptions, some dealing with the whole people of Boeotia, others with individual Thebans, also a decree about a boundary between two Boeotian towns. It is true these blocks were found not *in situ*, but a good deal further down, south of the wall marked "Helleniko" in the garden of a modern house, but M. Homolle has no doubt that they belong to this spot. The Treasury of the Boeotians is built of bluish limestone in the form of a Doric temple. It stands on a foundation of tufa blocks, which, like those of the Sikyonian Treasury, seem to have come from another earlier building, and, to judge from the mason's marks, of the same date. The whole building has suffered much, and though its ground plan can be made out, only the remains of the south side are now actually *in situ*.

The last of the Treasuries to which we came is perhaps first in importance, *i.e.*, the Treasury of the Athenians. Its claim to special attention is a double one. In the first place, its date is secure; we know, both from literary tradition and the evidence of inscriptions, that it was built to commemorate the battle of Marathon. Its sculptures and its architecture, therefore, furnish a fixed point, a standard by which we may help to date other monuments whose chronology has so far been problematic. Secondly, both the architecture and the sculptural decorations are of a fineness and finish of execution so far unique. The architecture of the building can be completely restored, and many of the metopes are marvellously well preserved. With the exception of the

lowest step, which is of the reddish calcareous stone employed in the Athenian Stoa, the whole building is of Parian marble, the metopes of a fine quality, the triglyphs of a bluish, somewhat coarser, stone. The sculptures of this Treasury are, for the present, kept apart in a basement room of the temporary house where the French excavators live. At the first glance we feel as though we were looking at a series of Theseus and Herakles vases of the finest period directly rendered into marble, the same types, the same careful, delicate detail. One façade was devoted to the labours of Theseus, six in number, the other to those of Herakles. The sides were decorated with combats of Amazons, a Geryoneia, and possibly a Gigantomachia, but these are less well preserved and at present of uncertain disposition. One of the best of the series is a bending figure of Herakles with lion skin knotted about his neck; in the field are his bow and arrows with a piece of drapery, figured exactly as these recur again and again on red-figured vases, a bull and an Athene and Theseus standing opposite each other, the hero apparently awaiting the orders of the goddess. The contests with Periphetes, Sinis, Kerkyon, and the Minotaur have also been made out. Of the pediment sculptures nothing so far has been discovered. Two figures in the round of mounted horsemen and Amazons which at first were believed to belong to the pediments are now attributed to akroteria. Some twenty or thirty years later than the Siphnian sculpture, and of much greater delicacy and finish, the metopes of the Treasury have still a slight savour of archaism about them. As to closer relations with other known sculptures it may be better to await the full publication of the metopes.

On the north side of the Sacred Way, exactly at the corner where it turns sharply north, a quadrangular building is marked on the plan to which M. Homolle gives no name. He conjectures that it may be the Bouleuterion. M. Potow, on the other hand, would see in it the Treasury of the Cnidians, which Pausanias mentions in one breath with, and must have seen at the same moment as, the Treasuries of the Boeotians and the Athenians. Further excavations may settle this question, and may also yield to us the Treasury of Potidaia.

We have reached our goal with the Treasury of the Athenians; the plan for the present extends no further. After this last Treasury the road branches out into side ways east and west, and topography is likely to become more complex. With the issue of the next section of the plan we hope to continue our account. To describe the further monuments we saw on the spot without a plan would only be confusing. The great centre of interest—and, we may add, of disappointment, for not a fragment of its sculptures has come to light—the Temple of Apollo, still remains for discussion. We only add that close to its foundations have been found not only new fragments of the famous musical hymn, but also a beautiful statue of Antinous, one of the finest sculptured monuments that the excavations have yielded. How much yet remains unexplored is best realised by reading ahead in the account of Pausanias.

One lesser matter we hope will not escape attention, *i.e.*, the complete exploration of the Fountain of Castalia, at which every traveller stops to drink. There, as Dr. Dörpfeld pointed out on the spot, clear indications still remain that an extensive well-house once existed, analogous in its general plan and arrangement to the Enneakronnos of Peisistratos that he claims to have re-found for us at Athens.

Archæologists from all Europe met this spring to do honour to the excavators of Olympia; we may hope that before another year is past a like tribute will be paid at Delphi.

NOTES.

IT appears that the Government have now at last resolved to keep the treatment of Parliament-street and Great George-street in their own hands; that is to say, the present Government has manifested an inclination to do something with these important sites, and some indication that they are disposed to take the Parliament-street improvement in hand before very long. But whether the successors to a Government which will probably not be very long in power will take the same view is still a thing to be questioned. The widening of Parliament-street at all events ought to be done at once; the continued postponement of an improvement the necessity of which has been obvious for a quarter of a century is a disgrace to London. As for the Great George-street site, the opportunity for making the most of it and utilising it as part of the site for a great group of Government offices worthy of the nation was lost many years ago, through procrastination and false economy. It is not very easy to see what is the best use to be made of it now for Government purposes, but no doubt on architectural grounds the rebuilding of the street, considering its position, is strongly called for, and must be carried out sooner or later. But any difficulties in regard to it need not delay the widening of Parliament-street, which ought not to wait for anything.

MR. HOLMAN HUNT'S "Romanes lecture" at Oxford is as the voice of one crying in the wilderness. It is nearly all true, but the truths we fear, are uttered to deaf ears. Mr. Hunt says that what had been the great misfortune throughout his term of observation had been the want of due cultivation of a knowledge of art by the rulers of the land and those who directed public opinion, and the system of appointing on committees of public taste gentlemen who had gone through no system of education such as would enable them to form right conclusions on the carrying out of public works and the selection of artists. In regard to the system of selecting artists by public competition, as in the Italian Renaissance, Mr. Hunt urges that in those days merciful art had not been invented, and the umpire had only to judge between one class of honest workmanship and another. We doubt whether some of the greater artists of the Renaissance would quite have agreed to that; but in any case there is still the difficulty that the committees who would make the selection would, as usual in England, be persons with little or no knowledge of art, and who would be as likely to choose the poorest design as the best. General cultivation in art, as a part of general education, is the great thing wanted in this country, and it is to be hoped that Mr. Hunt's strong words may not be entirely forgotten. As reported in the *Times*, Mr. Hunt's recommendations for attaining this end are as follows:—

"The first step should be to supply graduates of the Universities with a radical knowledge of the sciences employed in art, to qualify them for the development of a good judgment. All barely theoretical teaching was apt to mislead the amateur and puff him up with conceit. His study should be practical, and of matters that were sure. It might be a question how far such training should extend, but it might be at once laid down that a full acquaintance with the proportions of the human figure was required, with the laws of balance and equilibrium which controlled movements and the carrying of weights. Beyond such acquirements, a knowledge of the laws of perspective should be attained, and, as the due corollary, the simple laws of light and shade might be mastered. These and some understanding of the varieties of each people's decorative design, if well established in the amateur mind, might entitle a young man to a degree which should qualify him for any post of responsibility in the control of national works or in publishing opinions on matters of art. He would only add his assurance that such a simple provision by the Universities as that indicated would

impart great vitality to the whole range of English art design."

For Mr. Hunt's attack on French art, as an art "emanating, not from love, but from hate," there is unhappily, at the present moment, too much excuse, but he goes too far in saying that French art has done great harm to the world. The good it has given us has far outweighed the evil. Mr. Hunt seems here to be too much confounding morals with art.

THE account given in the *Times* of the work and position of the Hon. R. Balliol Brett, who has just been appointed Secretary of the Office of Works in succession to Mr. Henry Primrose, is characteristic of the way in which such appointments are regarded in this country. We have a list of the official situations Mr. Brett has held under various political leaders, of his membership of the House of Commons, and that he is the author of a book entitled "Footprints of Statesmen." But there is not a word of indication of any studies which might be supposed to have fitted him specially for such a position as that of Secretary of the Office of Works, which practically means having a great deal of influence in the control of large public improvements; not a word as to any special knowledge of architecture or building or the laying out of cities. In England such special acquirements are considered of no consequence either in a First Commissioner of Works or in the Permanent Secretary. The appointment is simply political. Mr. Brett may have all the accomplishments necessary for the post; we do not know that he has not; but it is obvious that no one cares whether he has or not.

THE protest entered by Mr. William Morris against a rumoured proposal to "restore" the Royal tombs in Westminster Abbey has our entire sympathy. Everything should be done, and we believe is being done, to preserve them from further decay; but, as Mr. Morris suggests, any attempt at restoration in the sense in which the word is generally used—inserting new Purbeck marble in place of old, and "polishing it up till it shines like glass;" restoring details of canopies and figures in imitation or guess work from what remains—should be kept for some "Old Westminster" model, whenever such a thing may be done. It should not be tried on the originals, thereby robbing them of all their reality.

WE have often complained of the poor design of the ceremonial keys which are prepared for the official opening of public buildings by eminent persons. Photographs of them are frequently sent to us for illustration, but it is very rarely that we find a design which, on its artistic merits (the only point we can consider here), is worth illustration. Some correspondence we have recently had in regard to one such key suggests one cause for such failures. It is said that ceremonial keys are never thought of till the last moment, and are then ordered in a hurry, leaving no time to procure a design from a competent artist; the only course being to put it into the hands of the best workman in the employ of the firm commissioned, and get him to make the best thing he can in a hurry. Of course, nothing very good is likely to be done in that way. Those who care about having an artistic key, or trowel, or whatever it may be, for a ceremonial occasion, should go to an artist to make them a design in the first place, before it is too late, and then commission a manufacturer to carry it out. It would be more fair to the manufacturer, who would probably much prefer that arrangement, and there would be a chance of some artistic thought and originality being put into the design.

THE Sanitary Exhibition at Paris is to be formally opened by the President on the 18th of this month, but it is not likely that it will be complete by that time, and, in

fact, we have been asked to make it known to our readers that exhibits will be received up to the end of the present month, provided that the application for space is made at once. The managers of the Exhibition, we understand, are rather disappointed that there is not more promise of exhibits from English firms, as a great deal of importance is attached to English sanitary work, and it was expected that there would be a large display of it. We may mention that the Managing Committee includes some of the best French engineers and architects of the day, and the Exhibition is likely to be an important one. There will be a Sanitary Congress held in connexion with the Exhibition.

THE twenty-seventh annual report of the Surveyors' Institution states that there has been a total increase of fifty-eight in the number of members during the past year, as against an increase of forty during the preceding year. The number of members of all classes—Honorary Members, Fellows, Professional Associates, Associates, Students, and Colonial Fellows—now on the books of the Institution is 2,367. The Institution commenced in 1869 with 202 members. In 1885 it numbered 1,192, so that it has nearly doubled its numbers during the last ten years. The report gives particulars as to the state of the funds of the Institution, the competition for its prizes, &c., and refers with satisfaction to the official standing given to the Surveyors' Institution in the Tribunal of Appeal established under the London Building Act. It is remarked that not only is the Institution entitled to be represented by one member to that tribunal, but that as a matter of fact all the three members at present constituting it are Fellows of the Surveyors' Institution. The Council are taking steps, it appears from the concluding paragraph of the Report, to increase the membership of the Institution in parts of the United Kingdom where at present it is insufficiently represented. Altogether, the Report ought to be a very satisfactory one to the members of the Surveyors' Institution, being both a record of past success and a promise of continued energy in the future.

THE underground Electric Railway, which is being constructed at Budapest, is not of any special structural interest to architects, but the business-like way in which its construction was decided on calls for some comment. Ordinary tramways, and afterwards electric tramways, had been proposed for the route, but the authorities very rightly refused to allow any disfigurement of the splendid Andrássy-avenue, under which the new railway now passes, or any inconvenience to the foot passengers of this favourite promenade. The plans of the Underground Railway were then submitted, on January 22 last year. According to a foreign contemporary, they passed the Common Council, a special Finance Committee, and a special Railways Commission by the end of April; and various Government officials, and the necessary Royal Commission, by the middle of August, after which the work could be commenced at once. This is a striking contrast to the procedure in Paris, where they have been debating and dallying about an underground railway scheme for several years, and is a wholesome example for London in regard to many public improvements which are promised, and delayed from year to year. The rapid improvement of Budapest is mainly due to this business-like energy with which work is pushed on, and older city communities may well take a lesson from it.

THE Bonshaw Estate, Dumfriesshire, which has lately been placed in the market, contains an ancient Border Tower, in a fair state of preservation. Within one mile are the ruined towers of Robgill and Wardhouse; the three being situated in the beautiful valley of the Kirtle, and in Annan parish; it is believed that they were erected at the same time in the earlier half of the sixteenth

century; not far distant is Kirkconnel. Bonshaw tower, the mansion-house adjoining it, stands about 90 ft. from the edge of a lofty cliff on the river's right bank. According to the description, with views and plans, given by Messrs. Macgibbon & Ross, in vol. iii. (1889), of their "Castellated and Domestic Architecture of Scotland," it consists of three upper floors containing one room a-piece, gained by a wheel-stair leading from the ground-floor, wherein are a vaulted cellar, lighted by four finely splayed shot-holes, and a small dungeon. On the first-floor is a hall, measuring 27 ft. by 17 ft. 8 in., and 10 ft. high, and having four windows and a handsome fire-place which projects 2 ft. from the wall, and rises 7 ft. to top of its moulded cornice. An aumbry in the south wall has an old Gothic-shaped lintel. On the second floor are a garderobe and a wall-press. Some sixty years ago ordinary slates were substituted for the large stone flags of the original roof; cannon-shaped gargoyles carry rain-water off the roof and battlements. Above the entrance doorway, facing southwards, is the sacred monogram and a motto: "Soli Deo honor et gloria." Wardhouse is reputedly the first house in Scotland entered by Bruce when fleeing from Edward I. The Kirtle flows by Kirkpatrick Fleming, Annan, and Gretna, into Solway Frith; in the first-named parish is Kirkconnel. A heap of stones was raised over the spot, on the bank of Kirtle Water, of the death, three hundred and fifty years since, of Fair Helen of Kirkconnel, at the hand of Bell, of Blacket House. She was, we believe, an Irving, and the Irvings built Bonshaw. Her grave is in Kirkconnel churchyard, where, also, was buried her lover, Adam Fleming, of Redhall, who took terrible revenge for the murder of his betrothed.

SOME noteworthy landmarks have lately been removed from the district between Fetter- and Shoe-lanes, and north of Gough-square. Goldsmiths'-row, on the south side of East Harding-street, is now incorporated with that thoroughfare; on the front of the "George" public-house (rebuilt after the designs of Mr. H. I. Newton) was a stone tablet inscribed "Goldsmiths' Row," the arms, in relief, of the Goldsmiths' Company are affixed to most of the houses in Great New-street, Red Lion-passage, East Harding-street, and to Messrs. Eyre & Spottiswoodes premises. That Company are, we believe, still ground-landlords of the property round about. Pemberton-row commemorates a bequest of Sir James Pemberton to the Company in 1613. In 1513 Agas Harding devised to them all her real property in the city and suburbs, now represented by McLean's buildings, in the area of New Street-square; Francis Ashe gave them six houses in Little New-street (1652); and in 1824 Thomas Harding bequeathed them about 5,000*l.* in consols and reduced annuities, in trust, for pensioners in the almshouses at Acton. On the wall, to the right hand of one descending the steps out of Great New-street into Robin Hood-court, is the Company's coat-of-arms; the two carved stones bearing their arms—the larger and older stone with date "1670"—have recently disappeared.

THE proposed competition for a new school for the Melbourne (Derbyshire) School Board seems to open brilliant prospects for architects. According to a report in the *Derby Mercury* of May 29th, it appears that the Board desire to have plans for the erection of a mixed school for 500 children, with central-hall and five class-rooms, and the usual adjuncts. For this they have decided to invite five architects to compete, to employ one of them (though we do not observe that they bind themselves to do that), "and to award £3 to the architects whose plans are rejected." Does this mean £3 among them—15*l.* each—or £3 to each? Either way, it is a remarkable offer, and ought to excite the best energies of the fortunate architects invited.

IRONWORK—THE GRAND PERIOD.*

BY MR. J. STARKIE GARDNER.

WHEN last I had the pleasure of addressing you, it was upon Renaissance ironwork, a subject, you were kind enough to assure me, that proved interesting. I doubt being equally fortunate now. As to the beauty and interest of Renaissance ironwork we were all agreed: there was no difference of opinion. But passing on to later periods we enter debatable ground, and had I ventured but ten years ago upon our subject to-night, I should undoubtedly have been proclaimed a Philistine. The theme is in fact the "rocaille," "rococo," "baroque," so much abused, and regarded as opposed to all the canons of the æsthetic, and all the doctrines of modern culture. For twenty or thirty years it has been the correct thing to denounce almost all art later than the Renaissance. I have just come across an essay by a late assistant-keeper of the South Kensington Museum in which we are, *ex cathedra* as it were, required to get two centuries of rococo out of our bones. Baroque and rococo were detestable, to be eliminated where possible, and our great Art Museum would not lend itself to debasing public taste by exhibiting any of it in its galleries. Yet even then there were individuals like the Rothschilds, or Sir Richard Wallace, who bought these things at high prices. The French, always so much behind in art matters, treasured their rococo specimens as national property, and encouraged their reproduction, which, though most costly, were readily sold, even to English people, especially at exhibitions. The influence of South Kensington has long helped to restrain English decorators from using these styles. But it was only damming the stream. The wealthy and travelled leisure classes, having found that no kind of decoration ever invented so entirely accords with the refinements of life as they prefer to lead it, insist on Louis XIV. or Louis XV. decorations. This may be a sign of decadence—many say it is so—but for my part, having been brought up in a house with Louis XV. drawing-rooms, I say that as backgrounds for well-dressed company, assembled for pleasure or social intercourse, these styles of decoration and furniture are unapproachable. They are not styles for cottages, but for town houses of well-to-do society, and it is therefore important that designers who are to take part in decorative work should be brought up with some knowledge of them, and that they should not be tabooed, as they are in the government and other curricula. Ignorance of the styles in request will no more fashion good designers than ignorance of scientific truths will make good churchmen.

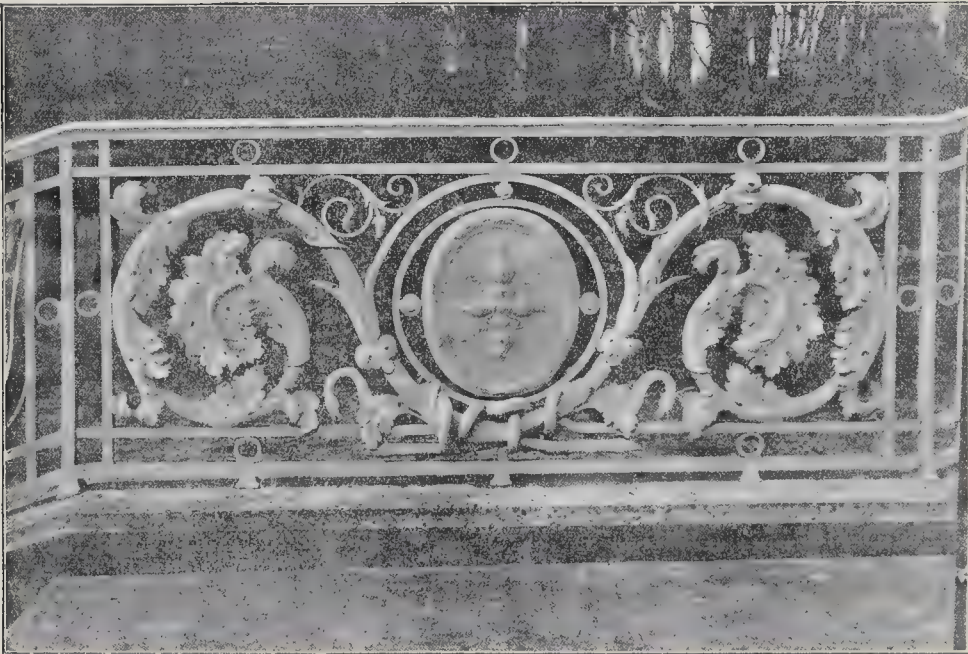
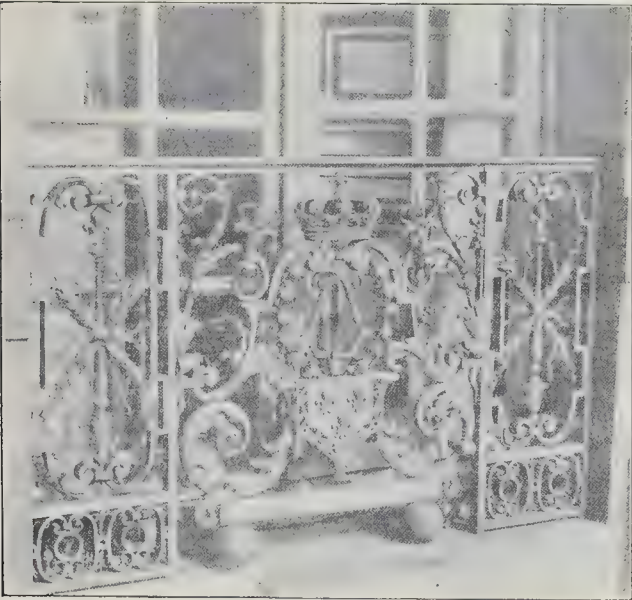
Now, but for the windfall of the magnificent Jones collection, students of decoration would have looked in vain for examples of these styles in our art museums. The works of artists like Caffieri, Goutiere, Boulle, names that are household words, to say nothing of English contemporary work from Wren to Chippendale and Adams, have been banished from our national art collections. How different was the view taken by the National Gallery, where artists of the baroque and rococo periods—Keynolds, Gainsborough, Romney, Hogarth—are so well represented. Even at South Kensington they bowed to the China mania, and admitted quite prominently Sevres, Dresden, and Chelsea porcelain, which display all the vices that baroque and rococo can be charged with.

However, my task is not to praise or dispraise, but merely to give you some account of, and to put before you some examples to enable you to form your own judgment of the merits or demerits of the grand period of ironworking.

The style known as the baroque is distinct from and preceded the rococo. It appears to have originated with the Jesuits of Italy, and its birthplace was undoubtedly Rome. The Jesuits did not deliberately invent a new style, but it was the outcome of the endeavour to adapt Renaissance—or shall we say Palladian?—architecture, to the purposes of Roman Catholic worship. The Jesuits were highly sophisticated, highly modern in their day, disliking Gothic as appertaining to the dark ages, and with a pronounced taste for richness and sumptuous materials. We do not, however, find any ironwork associated with the baroque until it had been introduced north of the Alps in countries where ironwork was habitually used in architecture. The effort to harmonise ironwork with the full rich lines of baroque decoration led to an entirely new treatment, which so far had merely been successive

modifications of Gothic. But it would hardly have changed so rapidly and radically without some special influence, and we cannot be wrong in looking to the most commanding figure in the art world at that period in Europe—I mean Rubens. By building the Jesuit Church in Antwerp in 1614, after his long stay in Italy (all but the outside of which was unfortunately destroyed by fire in 1718), he introduced the baroque architecture directly to the notice of the northern art centre in the Low Countries, as well as to France. None but richly curving lines would satisfy him, and from the date of his popularity, we find the ironwork of Flanders, and still more of France, began to assume a distinct character. Baroque architecture demanded baroque ironwork, or none, and but a slight impetus was required to start the new direction. No genius existed so capable of giving the impulse as Rubens, and before his influence was at its height, it was brought almost to perfection. Rubens' sway was complete for a time, in the matter of art, at the French Court, and henceforth the style of ironwork known as baroque began to displace all others wherever Court influence extended. He introduced a new and all pervading artistic atmosphere, in which the new ironwork had its place, and the old was out of fashion. There is no tangible difference in the ironwork of Louis XIII. and of Louis XIV., whose taste for magnificence the baroque entirely suited. It is only a question of scale and elaboration. Mansions were built in a more spacious style in the latter reign; the fore-courts were larger, and required gates and railings of more majestic aspect; while the magnificent staircases, occupying the very centre of the house, were provided with iron ramps and balusters, which stood forth as most commanding features. That is all the difference. In Italy the baroque never could have developed as it did in France, nor could it even in Germany; and it was doubtless nothing less than the overwhelming prestige of Rubens which caused it to develop so rapidly in the Art centres of Western Europe. I shall not trouble you with any illustrations of ironwork produced in the reign of Louis XIII. Paris abounds with specimens, such as the staircases of the Palais Royal and Bibliothèque, and the gates of the Parc de Carrouges; and at Fontainebleau there is the "*Escalier du Roi*," among other excellent examples. The gates to the Apollo Gallery in the Louvre are superb specimens made early in the reign of Louis XIV. They were brought from the Château de Maisons, completed by Mansard in 1658, though so early as 1649 Evelyn observed that the "iron gates are very magnificent." An engraving shows that they were designed or modelled by Daniel Marot, but the maker's name is unknown. I fail to find much fault with the design; but at all events all must agree that the execution is perfect, and notwithstanding their size they are most exquisitely chased and polished throughout. The work made for Royalty was, however, naturally, at that time, the finest. Over a million livres was spent on the ironwork of Versailles alone between the years 1664 and 1680, a sum which even the Grand Monarque deemed excessive, and which led to the disgrace, and thus indirectly to the death of his great Minister Colbert. The names of all the master smiths who worked for royalty are preserved, and it became a fashion among them to publish books of designs, most of which are now rare and very valuable. Ironwork on a magnificent scale was being produced almost simultaneously for Versailles, Marly, Fontainebleau, St. Cloud, St. Germain, Chantilly, Choisy, Meudon, Clagny, Sceaux, Vaux-le-Vicomte; besides what was required for the palaces and hôtels of Paris. The Church was also assuming the position of a very important patron, among the choir grilles executed in the reign of Louis XIV., being those now destroyed of St. Denis and Notre Dame. The greatest architects of the day did not disdain to lend their assistance in designing this ironwork, which smiths whose renown extended over the civilised world were destined to execute. Superb ironwork designs are interspersed in the publications of men of the standing of Jean Lepautre, Jean and Daniel Marot, Jean Bérain, Langlois, and Jean Le Blond; while we know that the great Mansard designed the work for Clagny and Meudon, Girard that for St. Cloud, and Gittard that for St. Maur. The finest of these designs by great architects were excessively costly, and they were produced by a generation of smiths who enjoyed more lavish patronage than has fallen to the lot of smiths before or since, and whose works show an elation and pride

* A Lecture delivered at the Society for the Encouragement of the Fine Arts, May 30.

*At Versailles.**At Versailles.*

museums? They were made during a period when magnificence was the fashion, and where magnificence is required they certainly do not fail to meet that requirement.

For reasons which want of time prevents my entering into now, the ironwork of the baroque as developed in France did not become the rage in other countries like its successor the rococo, and we shall therefore not meet with it again.

Long before the accession of Louis XV., the rich baroque had insensibly developed into the yet richer rococo, but it has been found convenient to designate the two styles respectively as of Louis XIV. and of Louis XV. The latter, owing to its capricious curves, curious mannerisms, and want of symmetry, is intrinsically displeasing to many, but its *tout ensemble* presents an air of luxurious magnificence not easily to be surpassed. Many people dislike it, but in a state of society which rejoices in silks, gilding, and marble, and requires a wealth of electric light, and flowers, and liveried servants, reception-rooms in the Louis XV. taste are most singularly appropriate. This stately luxury of style proclaims itself in every redundant curve of the ironwork, and the towering gates and grilles of the rococo eclipse everything that preceded it. It was an age of princely commissions to the smiths, who now appear far too absorbed in their work to continue the publication of illustrated books of designs as heretofore. The smith Lamour is scarcely even the solitary exception that proves the rule, for Nancy was then beyond the boundaries of France, but his atlas folio of works executed to the orders of ex-King Stanislas of Poland is on a par with the magnitude of his undertakings. The great publishing architects like Oppenort, Meissonnier, Cuvillès, Blondel, and Briseux, gave designs, while numerous engravers supplied books of patterns. The church, too, continued, and extended its munificent patronage of the smith, and scarcely a cathedral or abbey of France was unprovided with grandiose screens and choir grilles by the end of the reign. Those of Bourges and Amiens, some 20 ft. high, were designed by an eminent Court artist, Slodtz, and like the well-known grilles of St. Ouen at Rouen, were produced in this reign.

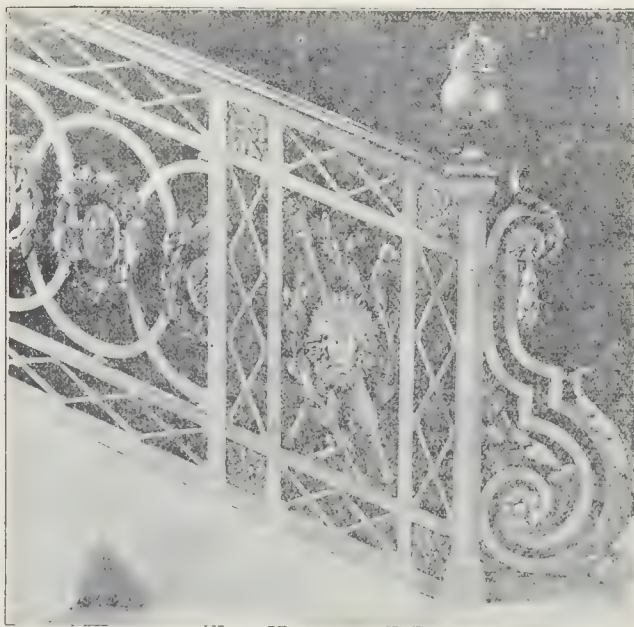
To illustrate the rococo ironwork, I have ventured to select the example of Lamour's work, which exhibits all the vices that can be charged to the style in the highest degree. Nancy was at that time, as I have said, on the German side of the frontier, where the style was always far less

of craft of corresponding degree. As the long triumphant reign of the Grand Monarque rolled on the style assumed a more and more massive grandeur, with yet more richly-flowing lines. One of the balconies at Versailles, probably the work of Simon Delobel, who made the doors for the "Escalier du Roi," is remarkable for the fine treatment of the acanthus leaves, and the consummate skill with which the lobes are gathered up and made to overlap by bold corruga-

tions of the grandly modelled surface. The fluted stems and framing of the medallions are triumphs of smithing, and the serpents only too life-like. But one other example of the baroque can be examined, also from Versailles. It is designed in a lighter mood, but with all the pompous attributes of royalty. As a piece of workmanship it is faultless, and in design most admirably fitted to its surroundings. Ought such works to be condemned as so bad in art that they are to be excluded from our art



Staircase of Hôtel de Ville, Nancy (about 1753).



Stair Balustrade at Compiègne (Louis XV.). Executed by Gabriel.

pure and restrained than in the heart of France. It is a panel of the staircase in the Hôtel de Ville, occupying one end of the Place Stanislas. The sharply-reversed curves and exaggerated endive leaves or cockscombs are, it must be confessed, in themselves not over-pleasing; yet what a charming picture this would make in the hands of a Meissonnier or Gérôme, were one or two ruffled and powdered figures descending the stairs. That even Lamour could be sublime, however, is shown by one of the grilles on the Place Stanislas,

comprising a fountain. To realise the design you must imagine a similar grille with another fountain, a Neptune figure facing it; and the two opposite corners of the place filled with ironwork grilles *en suite*. These were erected, probably between 1750 and 1755, to the glory of Stanislas, ex-king of Poland and father-in-law of Louis XV. There is no record tending to deprive Lamour of the honour of designing as well as producing the whole thing, which he in fact claims in his atlas folio previously referred to. Whether the details

are liked or not, there can be no two opinions as to the grandeur of the effect produced, and all must agree that we have absolutely nothing in metal-work to rival it in England. In presence of such work, produced without any effort, and in the usual course of business, I must confess that one feels very small, and that it is almost sacrilege to criticise. There is such conscientious working out down to the minutest details, such breadth, consistency and unity pervading the whole design, that even those who deem its direction wrong, must respect the thoroughness and masterly skill. I will content myself by merely calling attention to the fine metallic treatment of the pilasters, the swing of the work over the gangways, and the foil to the generally massy work supplied by the lace-like panels. Caviare, though it be to the multitude, there is something about the rococo that grows upon you as you study it; and I begin to suspect that our failure to appreciate it may not be altogether the fault of the style. Few, perhaps, can really appreciate Châteaueau, Latite or Steinberg Cabinet. If time had permitted I would have made a fuller analysis of this style in France and exhibited a few more illustrations. There is, however, a good specimen at Holland House, and several in the balconies about Park Lane. The gates at Sèvres, the Ecole Militaire, and the Paris Lycée may also be cited.

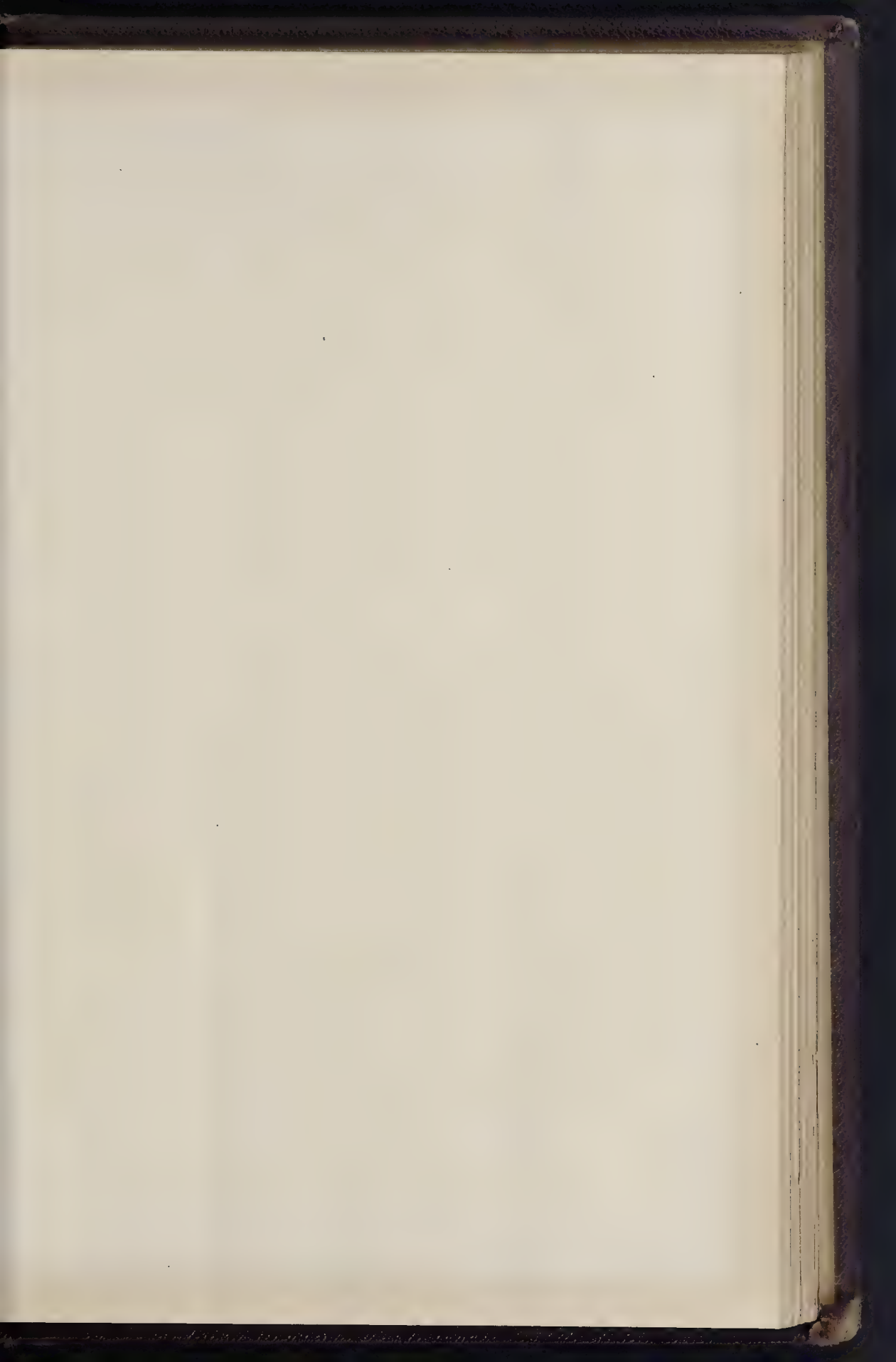
As the style of Louis XIV. existed before that monarch was born, so the styles of Louis XV. and Louis XVI. long preceded the advent to the throne of the monarchs whose names they bear. The designs by Challe for the church of St. Roch, executed in polished iron, with gilt bronze enrichments; the choir grille to St. Germain l'Auxerrois, which so delighted the clergy that they presented the smith, Pierre Deumier, with 12,000 livres over and above his contract price of 38,000 livres, and that for St. Germain des Prés, designed by Oppenord, are all examples of work in the Louis XVI. style, executed under Louis XV. A good example is that from Compiègne by Gabriel. The Classic feeling, which contrasts so strongly with the rococo, by no means at that time abandoned, was introduced through the exploration of Hercluleum in the middle of last century, which re-awakened interest in the antique. It appears to me quite hard and modern by contrast. At the same time Classic ornament undoubtedly acquired a peculiar and very elegant *cachet* in the hands of French designers, and it is peculiarly appropriate to boudoirs and small salons. The severe elegance of the lines, based so often on the Greek key with festoons and wreaths, was far less appropriate to smithing than the fantastic rococo, yet the craft held its high position and the great smiths continued to achieve reputation and fortune in this reign. Even the king himself became a pupil of Gamain, making the third French king rumoured to have been an accomplished smith.

The grille to the Palais de Justice cost no less than 200,000 livres. The railing part is like the famous rail to the Petit Trianon, merely a row of bars ending in tasseled spear-heads; but the gates, by Bigonnet, are of massive grandeur. Magnificent as they are, you will scarcely need to be told that the design is quite inapplicable to wrought-iron, for though its execution would be simple to the founder, it presented enormous difficulty to the smith. It shows in some respects a reversion to Early Louis XIV. work, such as that in the Apollo Gallery of the Louvre. There are gates of similar style, by Fayet, to the old Ecole Militaire, and magnificent staircase work in the Petit Trianon, polished and with gilt bronze foliage. Though few smiths published illustrations, the great advertising era had now set in, laudatory notices appeared in the *Mercur*, and exhibitions were held with as much as 3 francs per head charged for admission.

We must now take leave of French art. Its most surprising characteristic is the hold it took on civilised Europe. Copies of French fashions were universal, only becoming provincial and specialised in proportion to the remoteness from the French centre. Never since the Roman Empire had one people's art so complete a monopoly in Christendom.

[The lecture closed with some remarks on Italian, Spanish, and German rococo work.]

MEMORIAL PULPIT, BRERETON, STAFFORDSHIRE.—The Bishop of Shrewsbury dedicated a new pulpit at St. Michael's Church, Brereton, on the 31st ult. The pulpit, which is of oak, has been designed by Mr. Bridgeman, of Lichfield.





NORTHAMPTON INSTITUTE, CLERKENWELL VIEW OF FRONTS IN LOWER C



ST. JOHN'S STREET ROAD—MR. E. W. MOUNTFORD, F.R.I.B.A., ARCHTCT.



Grille of Palais de Justice, Paris.

MAGAZINES AND REVIEWS.*

The *Studio* contains an article by "G. W." "The Garden and its Art," chiefly in relation to Mr. Elgood's garden pictures, in which ideas are set forth with which we are entirely in sympathy. "Where houses are, gardens should be more or less designed in accordance with them," is a principle which every architect will echo. The article on Miss Mary Newill's work is accompanied by some admirable black and white studies of trees. An illustrated article on "A Japanese Course of Instruction in Wood Carving" gives some very suggestive illustrations of the development of simple forms of carved diapers in woodwork.

The *Magazine of Art* sends four numbers of Royal Academy Pictures (not completed), an admirable set of illustrations from this year's Royal Academy.

The *Architectural Record* publishes No. 1 of "Great American Architects' Series," illus-

trating the work of Messrs. McKim, Mead & White. We do not altogether like to see a "firm" of three architects treated in this way. The volume contains a number of illustrations, chiefly of domestic architecture, many of which are admirable; but we should like to know which of them is the work of McKim, and which is Mead, and which is White. It is quite certain that three men together cannot design a building. There is a good deal of originality in many of the designs; in some, on the other hand, there is very obvious and apparently intentional copyism, which the editor has recognised by illustrating, alongside some of the designs, the buildings from which they are obviously copied or adapted; the Giralda, the Paris Bibliothèque, &c. Perhaps there is nothing better in the book than the design for a "Lifesaving Station," with its almost rude treatment in rough stonework—a kind of thing that American architects have learned to do better than any others.

The *Engineering Magazine* contains an article by Mr. J. B. Robinson on "The Proposal to License Architects," a subject which is exciting attention and discussion in the States as well as in Europe. The writer is entirely against it and thinks the measure is intended "to restrict the number of accessions to the ranks of a profession

which has of late been filling up rapidly." He wishes the public were a little less fond of being protected by kind people who volunteer to protect it, and a little more fond of protecting itself. That is one side of the question, and perhaps the best side.

The *Antiquary* includes "Notes on two Round Towers at Montpellier." These are two towers which flank and support the western porch of Montpellier Cathedral. An illustration is given of them, and very curious objects they are. The writer compares them, not unnaturally, with the round tower at Brechin in Scotland, and with some of the Irish ones. The resemblance is not exact in either case, but it is evident they came from the same workshop, so to speak.

The most important article in the *Reliquary and Illustrated Archaeologist* is one by Mr. Miller Christy on "Dene-holes." Does the reader know what a "Dene-hole" is? It is a class of artificial caverns in the chalk, found mostly in Essex and Kent, with circular vertical spouts leading down into them. The vertical shaft is sometimes as much as 100 ft. deep, and penetrating the sand and gravel into the chalk, in which the excavation often ramifies into a series of caverns connected with each other. It is supposed that "dene" is the same word as "den." As a connected and illustrated account of a very curious set of remains of which not much is generally known, the article is well worth perusal.

The *National Review* includes an article by Mr. Harry Quilter on "Criticism and Art Production," which contains a great deal of plain truth and sound sense. Among the points touched on by the writer we may mention two. "Art," he says, "in which the artist retires behind his creation," which is always a mark of the finest work, is often unnoticed by the public and unpraised by the critics. But the latter, he urges, are placed in good positions exactly that they may see all that is passing and may prevent this injustice which the haste and competition of modern life are likely to cause. The other remark is to the effect that a great deal of the art criticism of the day is influenced by commercial considerations. He mentions one example of this within his own knowledge, which is significant and probably is not unique. In his depreciation of the landscape of this year at the Royal Academy, we do not at all agree with him. He asserts that the English painters have been driven to France for their teaching, and have acquired the French style in landscape-painting, which is based on the study of a different climate and conditions from ours, and that they are painting English in the French manner. As regards the majority of our best landscape-painters, the statement is absurd, and a comparison of the works by one or two English landscape-painters which are now on exhibition in Paris with the French work in the same exhibitions is sufficient to refute it, or ought to be.

In the *Fortnightly Review* Mr. Claude Phillips writes on "the Pictures of the Year," an article which, though we certainly cannot agree with all the views expressed in it, contains a great deal of very thoughtful criticism. Among other things he has hit the real weakness of Sir John Millais' principal work—viz., its lack of imaginative power; and he has done good service in pointing out the want of relation between aim and achievement in Sir E. Burne-Jones's picture of the "Fall of the Rebel Angels," in the New Gallery. As Mr. Phillips most truly says, "The fall of Lucifer is a subject so mighty that it may not be treated as a mere decorative pattern to be worked out, like the lovely 'Golden Stair,' with the aid of forms having more or less the semblance of humanity."

The *Nineteenth Century* contains an article by Mr. Richardson Evans, the promoter and hon. secretary of the "Society for Checking the Abuse of Public Advertising," on "Advertising as a Trespass on the Public," which we recommend to the notice of our readers. The Count de Calonne's article on "The Two Salons" is something more than mere picture criticism, and shows a remarkable breadth of view and absence of merely French prejudices. We observe that the writer expresses himself quite as strongly as we did in regard to the vulgar and offensive character of the large picture by Gervais, which has been officially purchased, and which, he says, is hardly fit to exhibit in public; so that it is evident that all Frenchmen have not the coarse taste displayed by some of their leading painters.

Harper contains an article by Mr. William Sharp on "Rome in Africa," with a number of small illustrations. It may direct popular attention to a subject which is far too large and too full of interest to be treated or illustrated in a magazine article.

The object of these notes is to point out anything in contents of the current magazines which is of special interest to our readers, with occasional brief criticisms on views expressed in such articles. When a magazine has been sent to us is not noticed, it is because that number contains nothing that it is within our province to comment upon.

The *Century* devotes a short article to the new Public Library in Boston (the building externally inspired by the Bibliothèque St. Genevieve), by Mrs. Van Rensselaer. This is the building for which, our readers may remember, Mr. Abbey painted that fine series of works in illustration of the Holy Grail, which was exhibited not long since in London. M. Pavis de Chavannes is also at work for it, as we observed in speaking of his picture at the Champ de Mars Salon. Mrs. Van Rensselaer's article is of no critical value, but it gives some information as to the progress of a great piece of collective artistic work, which is likely to do honour to America.

Scribner gives an account of "Chicago before and after the Fire," with illustrations of some of the old and new buildings, and also some from old photographs showing the aspect of some portions of the city immediately after the fire. The article on American wood engravers deals with the work of Mr. Frank French, which is illustrated by a frontispiece of his engraving after Deschamps' "Little Beggar Girl," as an example of his style.

The *Review Scientifique* publishes an article by M. G. Sorel on "Evolution Moderne de l'Architecture," to which however we cannot attach any value. The writer starts with a most absurd statement in regard to Greek architecture, that "La symétrie et la combinaison de formes régulières leur parrasaient tout à fait négligeables," and arrives at the evolution of modern architecture in the shape of iron combined with terra-cotta and cement. We have heard all this before, and we do not think it leads to much.

The *Monde Illustré* includes a well-written criticism on the chief works of the Salons of this year, with some rather inadequate illustrations. The number also contains an article on the rebuilding of the Opéra Comique, giving elevations of four of the competition designs, including the selected one (which we published), the others being those of M. Esquié, M. Blondel, and MM. Larche & Nachon.

In the *Zell Mall Magazine* the article on "Portsmouth: Past and Present," gives some illustrations and annals of the past of a town which has a peculiar interest from the part it has played in English naval history.

The *English Illustrated* contains an illustrated article on the "Château d'If," by Mr. Walter Herries Pollock, the interest of which however, as might be expected, is rather sentimental than archaeological.

The *Gentleman's Magazine* contains an article by Mr. Lionel Cresswell on "The Curfew; its Origin and History." He combats the popular idea of the Curfew being a tyrannical police act on the part of William the Conqueror, and gives other derivations and reasons for the word and the practice than those commonly held, for which we must refer the reader to the article.

London Society gives its readers a sensible article on the Spring Exhibitions of this year, containing some good critical remarks in a "light reading" vein, but disfigured by some very bad mis-spelling or printers' errors in names—"Velasques," "Studwick," &c.

Punch Pictures continues to appear monthly, and the last number contains one or two of the most charming of Leech's old sketches of children, which many will be glad to see again.

THE SANITARY INSPECTORS' ASSOCIATION.

A PROVINCIAL meeting and conference of the Sanitary Inspectors' Association was held at Worthing on Friday and Saturday in last week. The proceedings were opened on Friday in the Town Hall by the Mayor (Mr. W. H. B. Fletcher), who briefly but cordially welcomed the members to Worthing.

The real business of the Conference began on Saturday, when a public conference was held in the Town Hall, the Mayor again presiding.

The Mayor, in opening the proceedings, expressed great regret at the absence of the President of the Association, Sir B. W. Richardson, who was to have delivered an address, but who found it impossible to be present. Worthing was, he understood, the site of that projected city of Hygeia which it was proposed to form some years ago to carry out the ideas propounded by their President in a paper read by him at Brighton in 1875.

The President's address was then read by Mr. E. Tidman, C.E., F.S.I., the Honorary Secretary. After referring to the continued activity and success of the Association, the President said that the great points essential

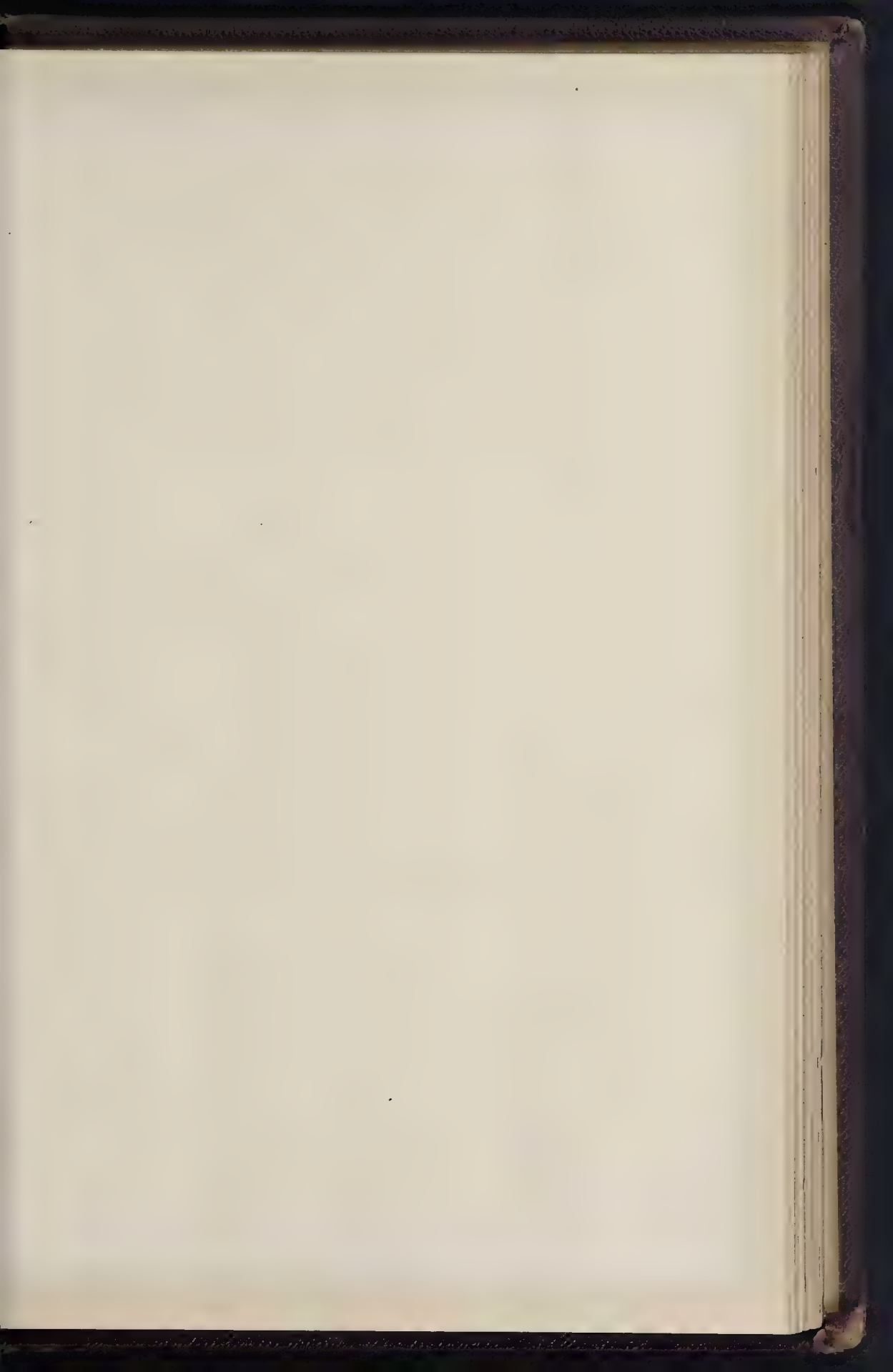
to their continued progress were, first, unity of purpose and endeavour, so that they might, as a body of men, scattered widely through the country, have a common object, insisting on their own proper recognition, remuneration, and consolidation. Their second great point was of the educational character. They had now secured to themselves fixed and important duties which must not be allowed to rest on caprice or blind obedience to commands, but must be directed by an intelligent understanding of the duties entrusted to them, and must become in every sense of a true scientific character, with a clear foresight of the usefulness that is to come out of their labours. For the purpose of carrying out the educational plan it would be advisable for them to have a school in which systematic instruction should be regularly carried out in the directions of their practical work. Occasional lectures such as they had had delivered were of unquestionable service, but really they ought to have regular courses, in session, from fixed and able teachers or professors. There should be at least three or four of these: one, chemical; two, statistical and hygienic; three, purely hygienic and practical; and four, engineering and construction. There should also be means by which every intending inspector should be obliged for one or two years to act under the supervision of a chief inspector, so that before he entered on practical duties on his own account, he might have a good preliminary knowledge of them himself. The President could see no reason why an institution of this kind should not be carried out at once by them in a central home that would afford offices, a library, a lecture-room, and every other convenience for a complete organisation. Good classes would attend at such courses of lectures as he had named, including not intending sanitary inspectors merely, but men and women desiring special knowledge in matters pertaining to public and domestic health. A very important subject regarding the examination system was before them. It was just and right in any examination carried out for sanitary inspectors, that they should take part; indeed, from experience, he could imagine no complete examining board unless some of them could form part of it, since they alone had the technical knowledge that was required specially for the duties. He believed that the best of all plans would be for their council to nominate a board composed chiefly of outsiders, which the Local Government Board could duly recognise, and that the practical working of the scheme should be carried out by themselves. But he urged that every candidate should be forced to show proof that he has more than mere book-knowledge, and that he should furnish evidence of having been engaged, say, for two years, at the work under the direction of a competent inspector. This would give solidity to his knowledge, and useful application for the commencement of his duties. The President suggested that when they had a house of their own in which to carry on their teaching and other duties, they should form at once a good library.

A paper by Alderman Cortis on "The Dwellings of the Poor," was then read in the author's absence by Alderman Piper. Little had been done to improve the homes of the poor, said the author, owing principally to the apathy of the Local Authorities and to the greed and avarice of many of the owners of slum property, who have been encouraged to possess it by laxity in enforcing the law. He then referred to some of the evils resulting from this laxity, first of which was the increased mortality of the nation. In the central part of London the annual death-rate was about five per thousand above that in the north, south, east, or west. But this increased mortality was not the greatest evil—in fact, were the increase confined to the districts causing it, he should hesitate to call it an evil at all from a worldly point of view. Because—and this was the second evil—while they lived they waged a perpetual war against society, which to defend itself was driven to make laws curtailing the liberties of law-abiding citizens; they entailed also an immense loss on the nation by forcing us to increase our police, magistrates, judges, and juries, and eventually they had to be housed in our reformatories, gaols, and workhouses. Thirdly, they were schools of vice, entailing moral degradation on the pupils, to be disseminated through the length and breadth of the land. Another evil to which we were subjected through the existence of these congested districts was the importation of the pauper alien. Demolish rookeries and slums, and there would be no place for the pauper alien. Capital invested in the rotten homes of the poor yielded the highest interest—they were the dearest homes in the land—and simply because the sanitary authorities closed

their eyes and ears, while the owners took their 10 to 20 per cent. profit. Thus people with limited capital were tempted to invest in them, screwing out of them the greatest profit they could, and keeping them at the lowest level of dilapidation; and it often happened that, when an attempt was made to improve them, the owners were found to be almost as poor as the occupiers, and the authorities, under the circumstances, hesitated to enforce the law, which, if carried out, would involve the ruin of the owner. The proper plan was to insist on good sanitary conditions, so that the small capitalist would cease to find these poor properties the most profitable investments. Since the passing of the "Housing of the Working Classes Act, 1890," out of forty-eight houses reported unfit for human habitation in Worthing, twenty had been put in order and made habitable, twenty-eight closed, and fourteen eventually demolished. Still, in his opinion, some provision should be made for the ejected. His suggestion was that in every town municipal cottages should be erected. These should be tenanted from time to time by ejected families, for the first year at a low rent, for the two following years or more at a fair and moderate one, always with an understanding that the tenants would after the third year be liable to removal, to make room for others similarly ejected. These cottages would be models and examples wherein the occupiers would become educated as to the domestic and sanitary requirements of a home. The "Housing of the Working Classes Act, 1890," was comprehensive enough with this exception, the great need being administration: thorough systematic, sanitary inspection, with fearless and honest administration of the law, a point on which the reader emphatically insisted on referring to the duties of Officer of Health and Sanitary Inspector, and the Sanitary Authority.

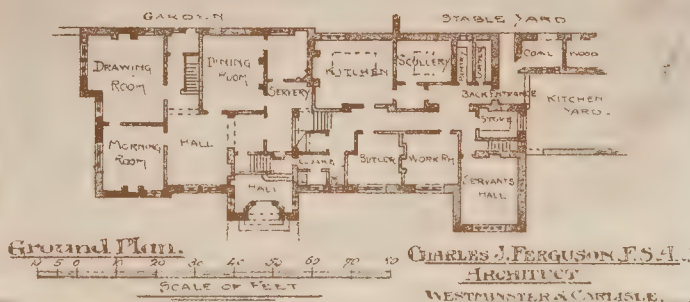
Dr. Charles Kelly, Medical Officer of Health for West Sussex, and Professor of Hygiene at King's College, read an interesting paper on "Death Rates," after which Mr. C. T. Gardner (the Chief Sanitary Inspector of Worthing) read a paper on the "Sanitary History of Worthing." Describing the condition of the place in 1845, when the population was about 4,000, the area 584 acres, and the number of houses 1,200, he alluded to a unique arrangement of drainage then in use on the first floors of houses in Warwick-buildings, now Warwick-road, in the shape of wooden hoppers, emptying into a wooden trunk which discharged on the foreshore. Yet, although in other respects also the sanitary arrangements were most primitive, Worthing neither in 1847 nor 1849 yielded a victim to cholera. In 1853, however, a Local Board was established, and in 1857, under the superintendence first of Mr. Ranger, and afterwards of Sir Robert Rawlinson, extensive systems for drainage and water supply were carried out at a cost of over 30,000l. The sewage was then conveyed to the Teville stream, discharging at the eastern extremity of the foreshore into the sea, but for some years afterwards a great portion of it was pumped upon land belonging to a local Company, the Worthing Land Improvement Company. Owing to the rapid growth of the town, however, in 1876, the outfall was found to be inadequate, and the local board decided to construct a new outfall sewer which should discharge its contents into the sea at low water. In the same year new machinery was added at the waterworks, costing, with the outfall, a further 14,000l. In 1881 improved regulations were made with regard to the water supply, and in 1884 further extension took place. In 1890 the Charter of Incorporation was obtained, and in the following year the census return showed a population of 16,606, an area of 1,425 acres, and houses numbering 3,189. In May, 1893, an unfortunate outbreak of disease occurred, and the Council decided to remodel and reconstruct the whole of the system of drainage and water supply. The sewage works were estimated to cost 40,000l., and the waterworks 35,000l., the Council having also decided to acquire the West Worthing Waterworks at a cost of 26,500l. In 1893 also the Sanitary Committee gave instructions for a house-to-house inspection of the borough, which had been proceeded with as speedily as circumstances would admit, the result being that upwards of 30,000l. had been expended by the various owners and occupiers within the borough to conform with the wishes of the Committee. It was apparent, concluded the paper, that the town was fast approaching its former prosperity.

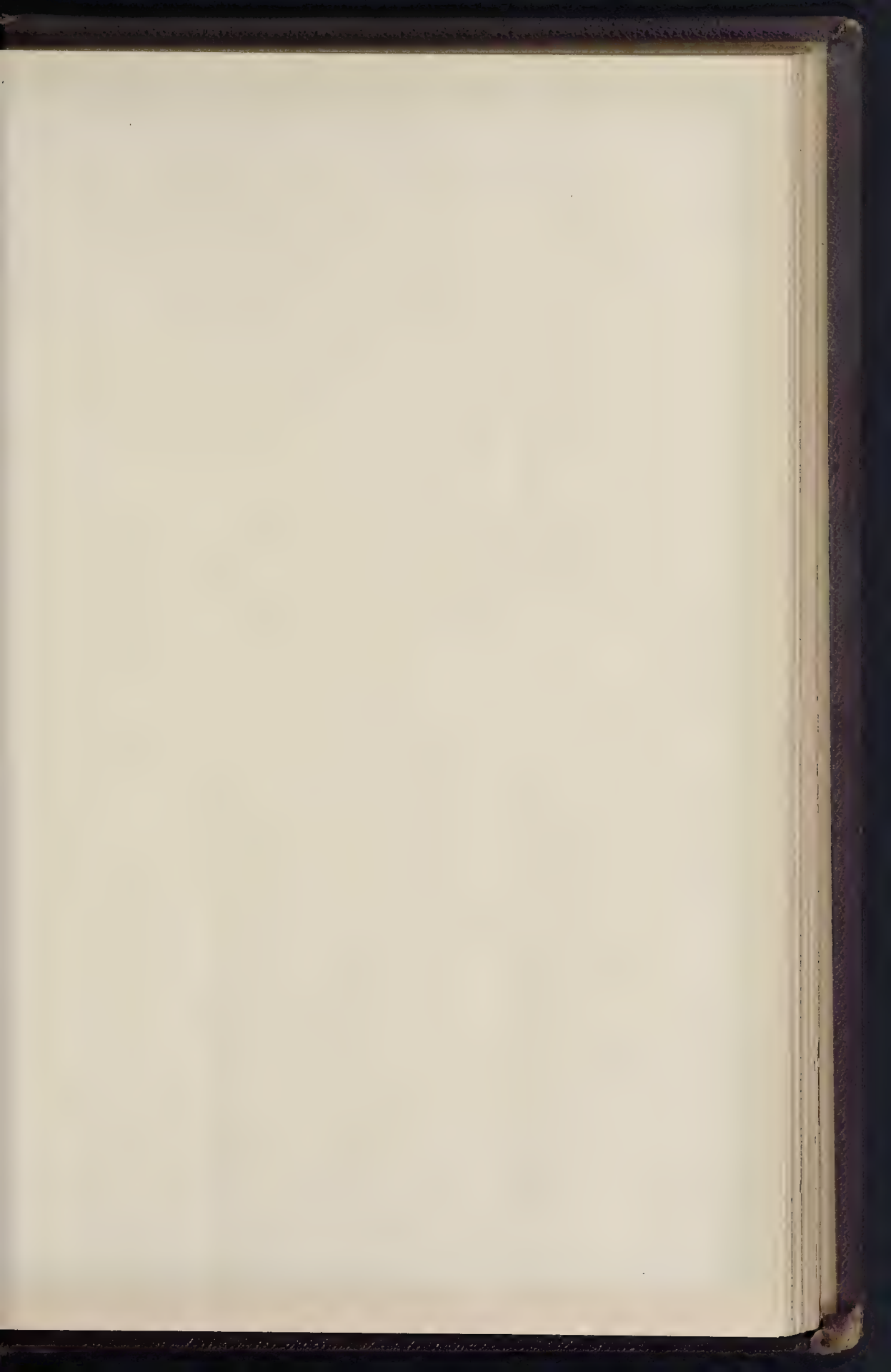
A vote of thanks having been passed to Mr. Gardner,





BADSWORTH GRANGE, YORKSHIRE, FOR THE MRS. HEYWOOD-JONES.





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Fluores (1840-1860)

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C. Zacher Pl. 5

Harry Red long

DESIGN FOR A SMALL & NEAT PENSIVE COUNTRY HOUSE

1/4" = 1' 0"



GROUND FLOOR



FIRST FLOOR

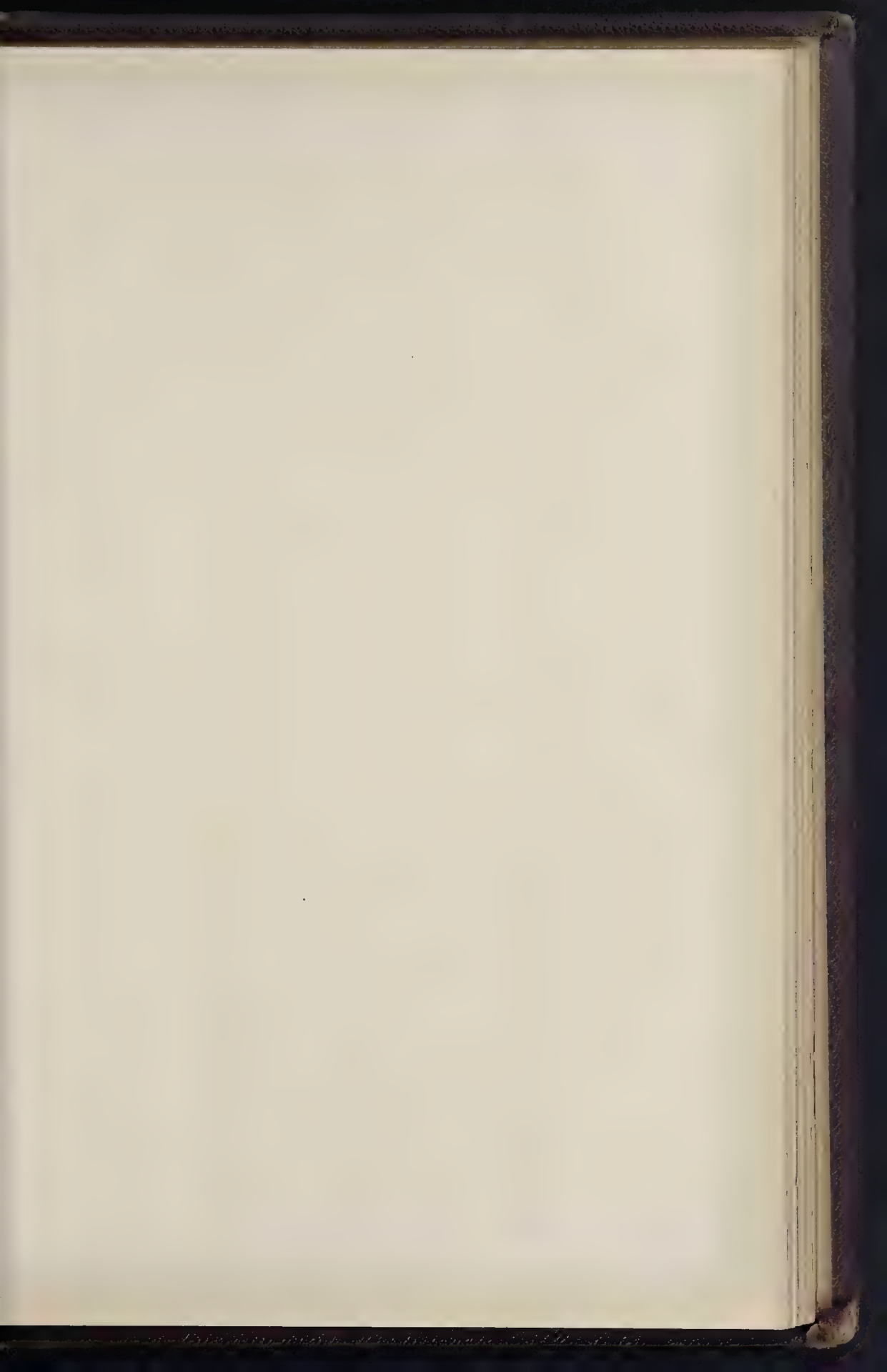


SIDE ELEVATION

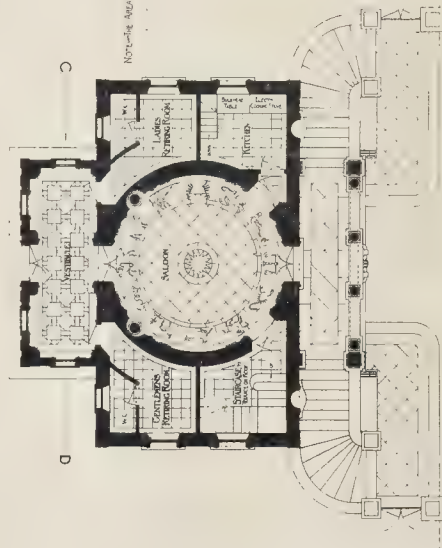


FRONT ELEVATION

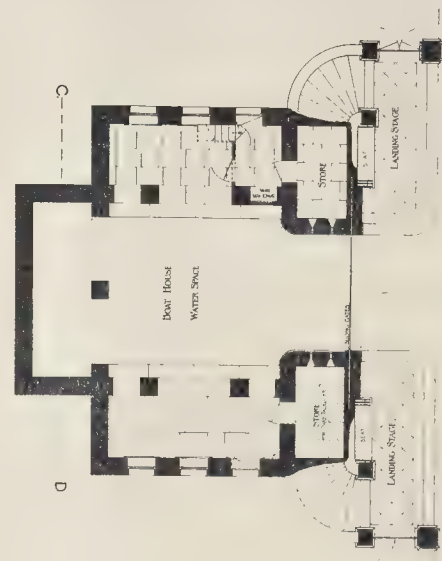
Arthur J. Cohen Archt.
Harrowgate



TITLE PRIZE COMPETITION
DESIGN FOR
A GARDEN-PAVILION
OVERLOOKING A LAKE. 1894



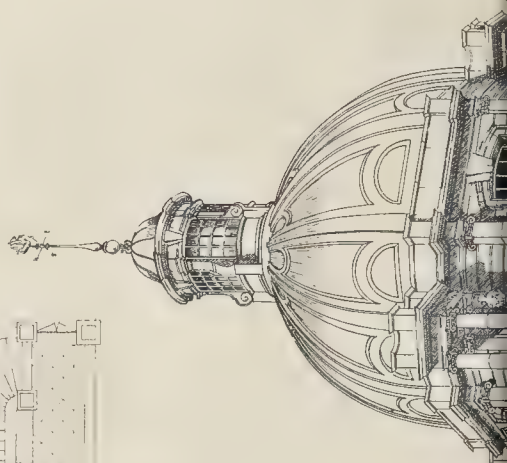
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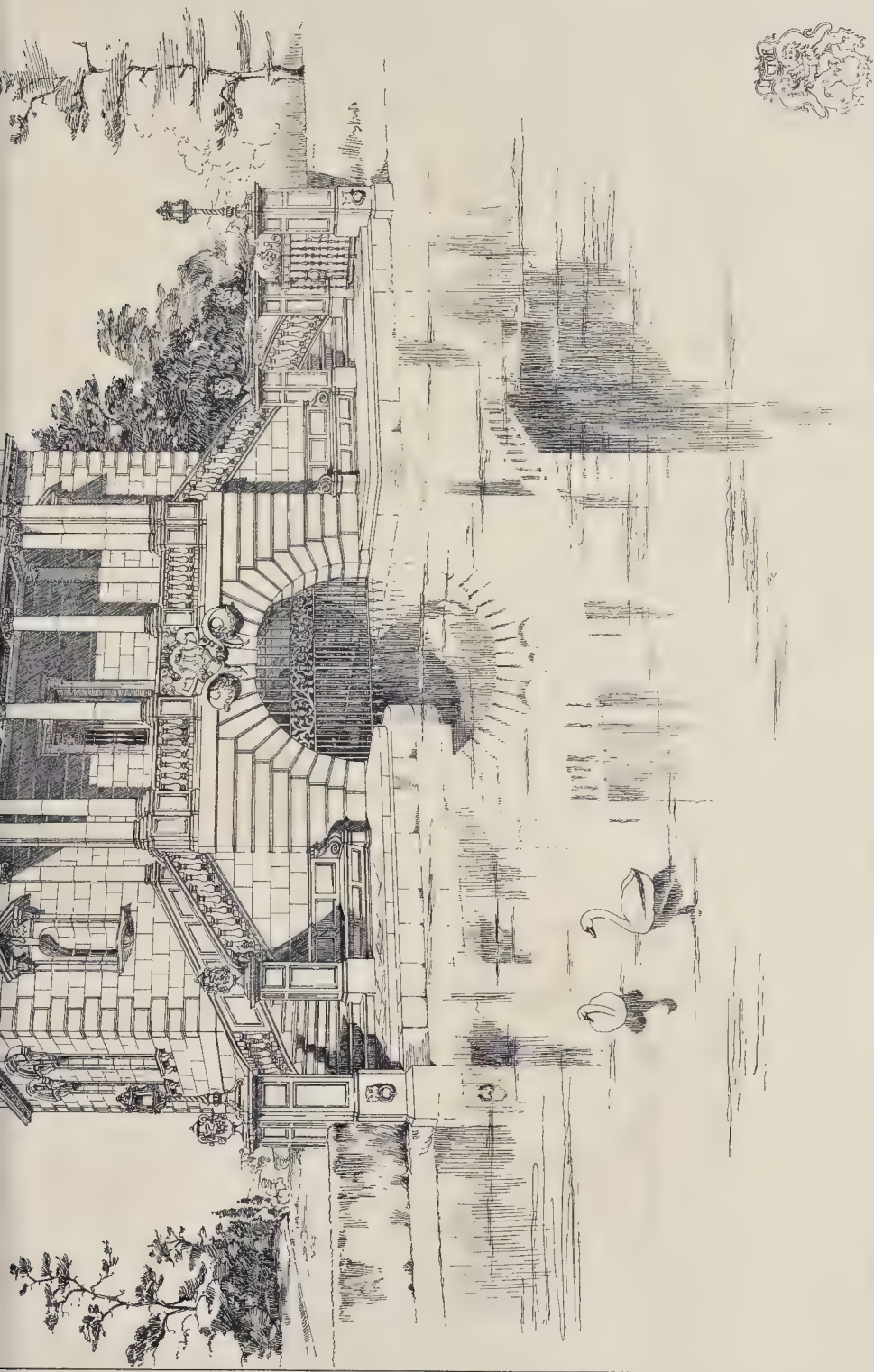


PLAN OF THE BASEMENT FLOOR

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NOTE: The design is intended to be a model for a pavilion overlooking a lake. The design is intended to be a model for a pavilion overlooking a lake. The design is intended to be a model for a pavilion overlooking a lake.





DESIGN TO WHICH THE FIVE PRIZE 1894 WAS AWARDED BY MR R. SHERLEIGH BALFOUR A.R.B.A.



PRINTED BY J. H. B. & CO. LONDON. SEE IN "JOURNAL" LETTER LANE 22

Mr. W. W. West, of Walthamstow, Vice-Chairman of the Association, read a paper entitled "The Sanitary Inspectors' Association: a Review and a Forecast," in the course of which he said that the Association must press onwards on the lines already laid down. They had to endeavour that the certificates of competency, which, in future, would inevitably be required of every candidate for office, should be of such value as to justify the confidence of the local authorities. They had been hoping to secure this by the establishment of a Government examination, and when they included in their ranks the whole of the inspectors in the Kingdom that they would get—recognising that they must spare no trouble or expense to enrol them. Having secured that all persons coming forward as candidates should be fully qualified by education and training, and show evidence of practical and theoretical knowledge, they would be in the strongest possible position for pressing upon the Legislature the need for investing them with the duty of inspection of their districts, that duty, of course, to be rendered possible by the possession of the necessary powers on the part of the inspector.

At the conclusion of the meeting, the members were entertained at lunch at the Assembly Rooms by the Mayor and Corporation, after which the gathering dispersed, when some of the members were taken for a circular drive, and others for a trip to sea.

Illustrations.

VIEW OF NORTHAMPTON INSTITUTE.

HERE is little to say about the Northampton Institute beyond what we have already published. The building, as shown in the drawing, is completed externally, but of the remainder of the work some is only just commenced, and some cannot be begun until the leases of the existing houses fall in, next Michaelmas. But this drawing was partly executed from sketches made on the spot. The statue in the apex of the large gable represents "Truth," and is executed by Mr. F. R. Montford, who has prepared also a very good design for the carving over the principal entrance.

The great hall is the principal part of the building at present in hand.

The roof has a span of 67 ft., and is made of steel, by Messrs. Moreland & Sons.

The ceiling inside is made from the architect's design by Mr. Gilbert Seale, of Camberwell.

The glazing over the swimming bath, shown on the left of the drawing, is by Messrs. Rendle & Co. The builder is Mr. Walter Wallis, of Balham. The Skinner's Company is finding great part of the endowment of the building, and is taking a leading part in the work generally. Mr. E. W. Mountford is the architect.

DESIGN FOR A GARDEN PAVILION OVERLOOKING A LAKE.

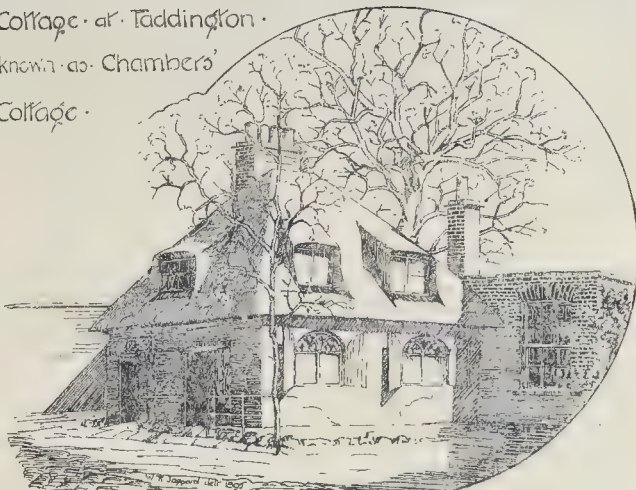
THIS is the design to which the Title Prize for 1894-5 was awarded by the Institute of Architects this year. The author of it, Mr. R. Skeleton Balfour, gives the following description of his intentions in the design—

"There was but one defect in the otherwise ideal subject set by the Royal Institute for the Title Prize, 1894-5, viz., the obviously inadequate area of 2,000 square feet for a building which, according to the conditions, was to comprise a boat-house, saloon, vestibule, retiring-rooms, and kitchen, together with all terraces and flights of steps.

A monumental building, and its corollary a symmetrical plan, and the observance of those principles upheld by the masters of the Renaissance, are also essential for the successful accomplishment of this competition.

In the design illustrated, the circular saloon is entered from the garden side through a rectangular vestibule, at either end of which doors lead to the retiring-rooms. The saloon was intended to have a black and white marble floor inlaid with the signs of the zodiac, the walls being treated with large panels of Sicilian marble and mahogany doors, and a broad frieze of flower-garlanded children in white and blue Della Robbia ware, occupying the space between the composite order of the interior and the spring of the coffered dome. The two semi-circular niches would be filled with statuary, and the corresponding doorways lead, one to the kitchen, and the other to the staircase communicating with the promenade on the flat roof surrounding the dome. On the lake front, flights of steps lead upward from the landing-stage on either side of the great archway,

Cottage at Paddington.
known as Chambers'
Cottage.



Old Thatched Cottage, Paddington.

through which a water access is obtained to the boat-house, to the open loggia before the saloon. From the landing-stage, bronze gates conduct to the garden walks by the water.

In the general design, mass, simplicity, and breadth of effect were aimed at, rather than intricacies of form and elaborate detail.

R. SKELETON BALFOUR."

BADSWORTH GRANGE.

THIS house was recently erected at Badsworth for the Misses Heywood Jones, of Badsworth Hall.

The site falls considerably to the east. Advantage has been taken of this to arrange the gardens and grounds at several levels, so that from the terrace of the upper gardens there is a view over the walled gardens, which are 9 or 10 ft. below the terrace. A convenient arrangement of steps gives access by degrees to the main front. To meet these different levels the floors of the hall and principal rooms are some 4 ft. above those of the entrance porch and offices, so that the windows of the best rooms are a foot or so above the level of the lawn of the middle garden, and at least 5 ft. above the garden of the south front, and the carriage-drive on the east front.

The house is built of local freestone, with red tiled roofs.

The sitting-rooms are finished in white, and the hall and staircase panelled in oak and floored in teak.

Mr. C. J. Ferguson is the architect. The drawing (by Mr. E. Ridsdale Tate) is exhibited at the Royal Academy.

HOUSE AT OXTED.

THE drawing for this house was exhibited in the Royal Academy of last year. The house has not, however, yet been commenced.

It is intended to use Limsfield stone for the lower portion. The upper story is to be plastered externally, the half-timbering being in oak. The octagonal stair-turret giving access to the servants' bedrooms is to be covered with copper.

HARRY REDFERN.

DESIGN FOR A SMALL COUNTRY HOUSE.

THIS house has been designed with a view of providing, in an inexpensive manner, a small country house, with a few of the additional comforts and attractions beyond the four square walls of each room, and especially with that of securing one good large living room.

The materials for the elevations are red tiles for the roofs and upper part of the fronts, with half-timbered work introduced as shown.

For the lower story the buttresses are of red brick, also the plinth, the remainder of the walls being covered with rough cast stopping at the plinth level.

The roof over the bath-room, hall, bay-window, &c., is of grey-stone slates, the pitch being a little flatter. In this district, where pantiles

have formerly been very largely used, it is a very common thing to find the eaves furnished with two or three courses of grey slates (at a flatter pitch) before the tiles start. The drawing was exhibited in the Royal Academy of 1894.

ARTHUR A. GIBSON.

OLD THATCHED COTTAGE, PADDINGTON.

THIS is a sketch of the cottage referred to in our "Note" on page 371 *ante*, which will probably shortly be pulled down. The sketch was kindly made and sent to us by Mr. Walter R. Jaggard, since the appearance of our paragraph in regard to the cottage.

ARCHITECTURAL SOCIETIES.

EDINBURGH ARCHITECTURAL ASSOCIATION.
—The annual general meeting of the Edinburgh Association was held on the 29th ult. in the Royal Institution, Princes-street, Edinburgh, Mr. W. W. Robertson, F.S.A. (Scot.), President, in the chair. The Treasurer (Mr. John Johnston, C.A.), intimated that the membership had increased to 295, and that the state of the funds were in a satisfactory condition. Other reports were submitted and were approved of. The following office-bearers were elected:—President, Dr. Rowand Anderson; Senior Vice-President, Mr. Thomas Ross, F.S.A. (Scot.); Vice-President, Mr. J. Balfour Paul, Lyon King-at-Arms; and the Secretary, Treasurer, and Librarian were re-elected to their respective offices. The President in his valedictory address, after referring to the great success which had attended the visits of the Association during the past few months, and to the large attendance, suggested that all members interested in these visits should communicate either to the Secretary or the President suitable places of interest as they occurred to them. He afterwards referred to the fact that in his inaugural address three years ago he had spoken of the various projects which from time to time were heard for the rebuilding of the City Chambers or of their removal to the New Town. He was glad to say that the question had now been definitely settled, and settled satisfactorily, by the Town Council, on the initiative of the Dean of Guild. The Council, he said, was now acquiring property in the neighbourhood which would give the accommodation required and would complete the building in a satisfactory manner. The effect of what would otherwise be a very dignified square was marred by the inclusion of the block at the north-west corner, which was now to be removed. He hoped that when the work was completed the Council would see its way to improve the façade to the High-street, which was marred by the intrusion of a range of very second-rate shops. If these shops were replaced by a system of suitable arcades the City Chambers would then be housed in a building which would be a credit to the city, and which would possess a repose and

dignity which would probably be looked for in vain in modern buildings—qualities which the exigencies of modern competitive designing went far to render impossible. Referring to the widening of the North Bridge and the probability of a demand being made for the removal of the Tron Church, the President strongly reprobated any such event as interfering with an interesting landmark connecting modern times with the time of Charles I. The new President then took the chair, and returned thanks for the honour the Association had conferred upon him, and votes of thanks to the retiring President and the other office-bearers brought the proceedings to a close.

Books.

History of the Tower Bridge and of Other Bridges over the Thames, built by the Corporation of London. By CHARLES WELCH, F.S.A., and J. WOLFE BARRY, C.E., M.Inst.C.E. London: J. Smith, Elder & Co.

ALTHOUGH this book has "History of the Tower Bridge" as its main title, it is really as much concerned with other Thames bridges; old and new London Bridge occupying, in fact, a large portion of the book. As Librarian of the City of London, Mr. Welch has of course exceptional access to sources of information as to the history of the works carried out by the Corporation of London, and has put a great deal of interesting record into a small compass, along with some illustrations taken from old drawings and engravings. The history of old London Bridge, as given here, is a curious example of perseverance and persistence in keeping up a structure which, for centuries, seems to have been in constant danger of collapsing through bad construction, and kept its custodians in a constant struggle with it. "The history of the bridge is almost a narrative of repairs. Only fourscore years had passed after its completion in 1209, when the structure was so decayed through want of repairs, that men were afraid to pass over it. Thus early did the bridge gain a reputation for frailty." This state of things continued till the final demolition of the bridge after the erection of Rennie's grand structure. "The history of London Bridge during the eighteenth century consists of doubts whether the bridge would stand, surveys of its buildings, repairs, reports of architects, schemes for its alteration, and controversies concerning the erection of a new bridge." An old engraving is reproduced showing the bridge-gate in 1610, with its ghastly burden of heads and skulls sticking on poles at the top, at all angles, like pins in a pin cushion. A special section is devoted to the chapel "St. Thomas of the Bridge," which was erected on the centre pier, with an illustration of the west front, in which the buttresses are drawn in perspective, but a scale of feet is added as if it were an ordinary elevation. This addition of the scale looks as if it were the author's, and shows in that case rather a confusion of ideas as to the use and application of the scale. The building was divided into an upper and lower chapel, the lower vaulted, the upper covered with a very low-pitched timber roof with heavy tie-beams, and three longitudinal beams notched on to them. The tie-beams rest on the capitals of wall-shafts carried up to the cornice, as in a Norman building with a timber ceiling. There is a good deal of information added as to the services held in the chapel, and the furniture and ornaments connected with it. An illustration, dated 1827, is also given of the old bridge house, a rather picturesque timber erection on Classical lines, with a small square tower carried on columns, leaving an open porch at the ground story.

A sufficient account is given of the new bridge and its construction, partly in Rennie's own words, and the history of Southwark and Blackfriars Bridges is briefly sketched with illustrations.

The description of the Tower Bridge, and its design and construction, by Sir J. Wolfe Barry, forms a separate section of the book, and is useful for the information given in regard to structural treatment of the work, while bringing out in melancholy prominence the extraordinary confusion of ideas of the modern engineer as to what constitutes "architecture." After the span of the bridge was increased by the requirements of Parliament, we are told, "it became apparent that it would be impossible to support the weight of the bridge on towers wholly of masonry, as in the first design, unless they were made of great size and unnecessary weight." Why "unnecessary"?

The only meaning one can attach to this curious piece of logic is, that it means "unnecessary" for their own stability as masonry structures. But that was not what they were to be built for; they were to be built for a special purpose for which extra strength was necessary, and therefore could not be called "unnecessary." The engineer proceeds: "It was consequently requisite that the main supports should be of iron or steel, which could however be surrounded by masonry, so as to retain the architectural character of the whole structure." That is the conception which a modern engineer has in regard to what constitutes "architectural character." It means masonry, whether put up for a genuine purpose or not. After that it seems hopeless to argue the point. In stating subsequently that stone work was a good protection for steel, and that the staircases to the high-level bridge required covering in from the weather, Sir Wolfe Barry's argument is more reasonable; and if a masonry tower had been built round the steel towers on its own foundation, with stair turrets at the angles and open arches at the top showing the steelwork and the connexion of the suspension-chains with that to which they were really attached, there would have been something to be said for it. But to build a skin of masonry actually carried by the material which it conceals, and to which it is supposed to give "architectural character," is an absurdity beyond anything that we have known in the whole history of architectural shams; and to our thinking it is a constructive absurdity also. A large construction in steel is a thing subject to constant movements of expansion and contraction, and we shall not be surprised if in time it is found that the masonry refuses the combination, and is unsettled and cracked by the steel-work.

We were the first to call attention to the essentially unarchitectural character and conditions of this structure; a criticism which brought on us some comments in general newspapers as absurd and illogical as the Tower Bridge itself, and one or two private communications in the nature of what may be called "threatening letters." But we have been fairly surprised at the unanimity with which we have found our view supported by architects and artists of all classes. Among these we have found the architectural design of the Tower Bridge universally condemned and ridiculed, and that with an energy of language and an amount of indignant feeling, which goes far beyond anything that has appeared in our columns.

Numismata Londinensia: Medals Struck by the Corporation of London to Commemorate Important Municipal Events. With Descriptive Notices. by CHARLES WELCH, F.S.A. London, 1894.

THIS book, prepared by authority of the Corporation of London, and under the direction of the Library Committee, has some affinity with the last-named, in spite of its very different title, as one of the medals was struck in connexion with the opening of London Bridge, and the chapter concerned with it includes a history of London Bridge, containing a good deal of the matter in the volume previously noticed, stated in a slightly different form. The other medals mentioned are in commemoration of the opening of the Coal Exchange in 1849, the foundation of the City of London School, the opening of Blackfriars Bridge and of the Holborn Viaduct, the foundation of the City of London School, and reception by the City of various royal and eminent personages. Good illustrations of all the medals are given, and it is with these that we are chiefly concerned. It will hardly be expected that we should find in these medals such delicate art as that of the great French medallists, Roty and Chappin; the ideas in some of them are good, but the execution is comparatively coarse in detail (as far as one can fairly judge from very careful engravings), and it strikes us that the older ones are better than the more recent examples; more delicately executed and in lower relief. That to commemorate the passing of the Reform Bill in 1832 shows a significant design on the obverse, and a pretty treatment of the reverse, with its chaplet of flowers, though these are a little too realistic (according to the taste of the day). In the medals connected with the opening of structures the reverse is generally occupied by a representation of the structure; and though this is not a kind of representation which is artistically suitable to the conditions of medal engraving, it is a use of medals consecrated by the most ancient custom, and which gives to many antique medals their principal historical value. The interior view of the Coal Exchange, with the dome not in true perspective, is, however,

rather an unhappy instance. The medal on the reverse of the Prince of Wales shows on the reverse the interior of St. Paul's with a worshipping throng, which is better managed. Excepting the last named, all these medals, as well as others of the older ones, were by Mr. Benjamin Wyon; the Prince of Wales medal is by Messrs. J. S. & A. B. Wyon, and is one of the best in the collection. By the same hands is the Princess Alexandra reception medal, in which the head of the Princess is finely treated, but the reverse, with the Princess in crinoline received by the Queen in a classic robe, and a winged angel standing behind her, is too absurd. The City of London School medal, by Messrs. J. S. & A. B. Wyon, shows a good medallistic architectural treatment on the reverse. The reverse of the medal commemorating the granting of the Freedom of the City to Prince Albert Victor, by Mr. S. G. Adams, is like that of the Princess Alexandra medal, absurdly realistic, a quality the more brought out by the too high relief used. There are others which, both in conception and treatment, are melancholy pieces of commonplace. Mr. Bowcher's reverse for the reception of the King and Queen of Denmark, showing the City of London personified by a seated female figure, with an architectural background indicated in very low relief, is one of the better ones. On the whole the collection is not calculated to give a very high idea of our national art in the department of medal designing; but it was worth while to make a literary record of it, as of some historical interest.

The Practical Telephone Handbook. By JOSEPH POOLE, Whitworth Scholar; Chief Electrician to the New Telephone Company, Manchester. Second Edition. London: Whittaker & Co. 1895.

THE second edition of this useful manual contains new chapters on Metallic-Circuit Working and on Electrical Measurements. Considerable alterations and additions have also been made in other parts, especially in the chapter on Underground Work, which has recently been adopted so extensively in this country. This book can be thoroughly recommended, and its title describes its contents accurately. The second edition comes out at an opportune moment, when so many technical questions connected with telephones are being discussed before the Select Committee of the House of Commons. Clear descriptions are given of the special exchange systems used by the British Post-Office and the National and Mutual Companies at Manchester. Readers will understand the difficulties that the London National Telephone Co. has to overcome in substituting the twin-wire for the single-wire system, as they have no less than thirty-four separate exchanges.

The additions to the book distinctly add to its value. No elaborate rules for locating faults are given, as telephone lines are generally not more than half-a-mile in length, and a linesman would be able to clear the trouble before the position of the fault was found out by a test. Mr. Poole complains that wiremen cannot be got to use the special dynamometers constructed for regulating the sag of wires, but prefer to use their own judgment. We sympathise with Mr. Poole, but are not surprised at the wiremen.

His instructions to inspectors are very clear and concise, and would be profitable reading to every user of the telephone. For example, the diaphragm is often buckled by users poking pencils at it, and the receiver spoiled by being dropped.

The chapter on electrical measurements is good, and is obviously written by one who has tried many methods, and fixed on the best practical ones. For measuring battery resistance he gives Munro's method and not the "telephone" method, a self denial on his part which deserves praise. An appendix gives good descriptions of the "Hunnings Cone" Transmitter, Mercadier's Bilephone, &c., with many other recent improvements difficult to find described elsewhere. It also contains a short abstract of Mr. Preece's paper "On Notes of a Trip to the United States and to Chicago."

There are one or two misprints, as in the formula for the Post Office Bridge, and in spelling names like Munro and Clark with an *c* at the end.

Electric Light for Country Houses. By JOHN HENRY KNIGHT. London: Crosby Lockwood & Son. 1895.

THIS little book aims at giving in a popular manner, information likely to prove useful to people living in small country houses who may desire to know how much it costs, and how to set up a

small electric lighting plant. The author seems to have managed to light his house cheaply, the whole installation of his sixteen lamps not costing more than 90s. He uses an oil engine, and as these engines are gradually coming into favour for small plant in isolated situations, the account of its performance is interesting. That it makes no objectionable smell is certainly a strong point in its favour. The book is a fairly trustworthy one, the only objection that can be taken to it is a lax use of electrical terms. For example, the author says, "Electric current is sold by the companies by the Board of Trade unit—that is 1,000 watts." He might as well say that leather belts were sold by horse-power.

Electricity in our Homes and Workshops. By SIDNEY F. WALKER. London: Whittaker & Co. Third Edition. 1895.

THIS book contains descriptions of electric batteries, telephones, and bells, but contains nothing about dynamos, motors, or lamps, hence the title is very misleading. The chapter on telephonic apparatus has been rewritten, descriptions of the latest forms of apparatus being given. A short chapter on the so-called "dry batteries" has been added, these batteries having come into extensive use. On electric mining signals Mr. Walker is an authority, and his descriptions of the special apparatus suitable for mines, and the precautions that have to be taken, will be valuable to mining engineers. A better title to the book would be "Electric Signalling in Houses and Mines."

Correspondence.

To the Editor of THE BUILDER.

FELLOWSHIP OF THE INSTITUTE.

SIR,—As one of the many Fellows of the Institute living in the country, and surrounded by builders, surveyors, auctioneers, and others who profess and call themselves architects, which is, if not an injury to us, certainly a great one to our Art, I do not find that people, who value good, rather than cheap, buildings, or art in any form, place very much reliance in such professors; and the only strength that we can rely on is to be found in honourable conduct, a desire to do good work for its own sake, combining good planning and arrangement with all the beauty of proportion and detail that funds will permit, and with breadth and dignity, where these are limited. It is difficult, of course, to persuade the public that the true test of good work is more frequently found in the latter instance than when money is found for mere elaboration, and I take it that the Fellowship of the Institute is as much the just reward of those who have done and do their utmost to be beautiful and true under difficulty, as to those who have greater opportunities. Personally, my only jealousy lies against those who throw away, or fail to live up to, the chances of doing noble things when they have them, but perhaps time may render this more difficult when greater pressure on this point is brought to bear upon us by a wiser and more discerning public.

The sensible views conveyed to your readers in the leading article of last week's *Builder* cannot fail to carry weight, and specially your comments on the remarks of Mr. Phend Spiers, who, as most of us know, is an artist *par excellence*. After all, architectural design and draughtsmanship is a means to an end; and instances are not wanting, both in ancient and modern work of beautiful designs poorly constructed, nor do I think that such will be frequent if care and practical ability are to be entirely ignored for mere power of design, *per se*, or "Art and Art alone."

"Something there is more needful than expense, And something 'e'en than taste—'tis sense."

I would on no account depreciate beauty in design, but merely try to show that though a great part of architecture it is by no means the *whole* of it.

"RUSTICUS."

THE WILLESSEN SCHOOL BOARD COMPETITION.

SIR,—The old subject of unfair competitions again takes up a considerable amount of your space, and will, no doubt, continue to do so until architects accept Mr. Caro's advice as published in your last issue.

I am a member of the Willesden School Board, and also an architect. With this double experience have come to the conclusion that these frequent complaints are absolutely useless whilst eminent architects are willing to enter what, under ordinary conditions, can but be lost. There are many people—some of them members of public bodies—who do not distinguish between sections and elevations, and who are unable to see the relationship of perspective and elevations, but they do understand the value of money; therefore, the

"lowest estimate" has a charm for them, which even a highly coloured perspective does not possess. In this Willesden competition some of the members were in favour of "the lowest estimate," others, again, preferred the design (or its author) placed last by the assessor; it was, therefore, impossible to get a majority to uphold the assessor's award, a result which *might* have been obtained had not Mr. Caro, as he says, sent in a honest price.

It is certain that this kind of ignorance, and perhaps this tendency to favouritism, will not be got rid of if all your valuable space, from now until doomsday, be given up to the subject.

Reform must come from the competitors, and not even from them as individuals. They must take a leaf from the book of the trade-unionist, however unpleasant such a step may at first appear to be; they must get their parliament of Conduit-street to formulate a law of competitions which shall be binding on the members of that body not to compete with each other under unfair conditions of labour, and public bodies will soon begin to advertise competitions under "Institute Rules," just as they are now asking for contracts with trade-union wages. Until something of the kind is done competitions will be "won," as a great number of them are now, by "getting hold" of the members of the committee, not by any merit in design.

Harlesden, N.W.

JOHN CASH.

The Student's Column.

BRICKS AND TERRA-COTTA.

XXII. AND XXIII.

ABSORPTION (Continued).

IF now we take a brick, break it in halves, and submit both to absorption experiments as detailed in our last article, we shall find in many cases (in all that we have tried) that the sum of the amount of water absorbed by them is a higher figure than that derived from similar experiments on the whole brick. This difference will be most noticeable on pressed and the hardest kinds of brick, and least on those which are soft and very absorbent. The effect on half bricks when used as "headers" may thus be easily imagined. Such results clearly show that in the majority of hard bricks, however well they may be burnt, the outermost portions act as a thick skin of a less impervious character than the bulk of the interior. This phenomenon is not well brought out by testing the material for its capillarity unless a longitudinal slice of the brick is prepared for experiment. In dealing with an inferior quality brick that had been glazed (apparently a salt glaze) we ascertained that it imbibed only 3.5 per cent. of its dry weight of water in a week; by drilling, or rather chipping, several small holes into it through the surface glaze, the same brick absorbed 10.73 per cent. in the same time. Of course, the brick was thoroughly dried before testing it a second time, the drying taking place until it had returned to its original weight. This seems to show that although a glaze acts as a preservative when the brick is not chipped in being put up, if any portion of it is removed by accident—and it is very brittle—the brick derives no benefit from its vitreous covering.

In 1868 a committee of the Manchester Society of Architects made careful experiments in regard to the absorptive powers of several local bricks. They differ from those we have carried out in several particulars, as will be seen. The following is a table showing some of the results obtained by that committee:—

TABLE I.—Absorption Experiments.—Manchester Bricks.

DESCRIPTION OF BRICK.	Contents.	Weight.	Weight per Cubic Foot.		Water Absorbed by Total Immersion.	Percentage of Water Absorbed to the Volume of the Brick.
			lbs. ozs.	lbs.	ozs. cub. in.	
Common Hand-made, average of ten samples	cub in 103'50	6 9'25	139'75	11'00	20 05	19'88
Machine-made	140'12	8 15'5	110'50	10'79	21'50	21'26
Machine-made	119'61	8 4'5	123'59	12'50	21'60	18'60
Machine-made	114'85	7 15'5	120'50	9'87	17 00	15'00

TABLE II.—Experiments on Rate of Drying.

DESCRIPTION OF BRICK.	Full Quantity Absorbed.	PER CENT. OF TOTAL ABSORPTION LOST.							
		In 1 hour.	In 1 day.	In 2 days.	In 3 days.	In 4 days.	In 5 days.	In 6 days.	In 11 days.
1. Machine-made, Manchester	0'5.	3'6	32'3	50'6	69'1	81'4	86'4	90'1	96'3
2. Light-coloured, machine-made	1'28	4'0	14'7	61'5	75'5	81'6	85'7	88'8	95'0
3. Hard, Bradford	8'3	1'8	42'5	63'6	78'0	81'0	82'5	83'5	91'4
4. Machine-made	8'1	—	30'0	61'0	72'7	78'4	78'0	82'0	82'0
5. Hand-made, Collyhurst	7'1	3'4	30'5	54'2	74'6	81'3	86'4	89'8	91'5

In these, the bricks were entirely immersed in the fluid, and the percentage was calculated with reference to the volume of each piece. There are certain advantages in this method, but we think a clearer idea is gained by calculating the rate per cent. by weight. The committee made a number of other tests, which may be summarised as follows:—One series showed the rate of absorption when the bricks were placed on edge in $\frac{1}{2}$ in. depth of water, whilst another gave the actual quantity of water absorbed per cubic foot of brick at stated intervals. The results proved that all the bricks, save one, became saturated thoroughly within 14 hours, some, indeed, in 2½ hours. The quantity absorbed was not in inverse ratio to density, the most dense imbibing 18.6 per cent. of their bulk of water. The rapidity with which the water was absorbed was most contradictory, and in this respect agreed very well with our own results (*ante*, p. 397).

One brick, which in the first ½ hour absorbed 30 per cent. of its total quantity, as against 47 per cent. in another, had at the end of 2½ hours surpassed the latter in the ratio of 85 per cent. to 68½, though far behind a third brick, which had absorbed 98 per cent. The majority of the bricks, when immersed, absorbed the water more rapidly at their sides and ends than at the top and bottom, as shown by air-bubbles; hence the committee was led to the conclusion that it was desirable to apply pressure, in moulding, in a different direction to that in which it was generally applied. Judging from our own observations on this matter (of course, with reference to unglazed and medium-burnt bricks), it would appear that the position in which the brick is stood in the water and the depth of water covering it are the controlling factors. Nearly all the bricks we dealt with allowed air-bubbles to escape with tolerable uniformity over the whole surface, though here and there they emerged in continuous streams as from a very open pore well supplied from the interior. It may be that superior methods of manufacture have removed the objections raised by the Manchester committee referred to.

In connexion with the subject of damp walls the following experiments are of interest; they show the rate of drying of five different bricks, after having been fully saturated and placed in air the temperature of which was estimated at about 65 deg. Fah. (see Table II.).

It will be noticed that in these experiments the figures showing the proportion of water parted with at the several stated periods are calculated (as in some of the absorption experiments alluded to) with reference to the quantity absorbed when the bricks were fully saturated. None of the bricks became thoroughly dry after being left in the air for eleven days, but in practice the case would no doubt be different. The surfaces exposed to the rays of the sun and the general temperature, would surpass 65 deg. Fahr. in summer time, and the action of the wind in drying out moisture would be considerable. The only value the above-mentioned results can have, therefore, is to determine the relative facilities of drying, in bricks dealt with under precisely similar conditions, in uniform temperature. We notice that the bricks which parted most eagerly with their moisture at first, were the longest in drying, and *vice versa*, a fact that might not have been anticipated. At the end of four days they were nearly all on an equality, and after that time Nos. 1 and 2 surpassed the others in rapidity of drying.

Bricks Nos. 3 and 4 behaved in a rather re-

clear of the shaft, in no part touching it. It will be seen that by such a structure the most perfect facilities were afforded for ascertaining the effect of heat on the brickwork. An index having been set up on the topmost landing, under cover, at a height of 80 ft. from the ground, it was ascertained that that length of shaft became five-eighths of an inch longer when the fire was lighted than when it was out.

The behaviour of bricks during a conflagration is well-known. Very few natural materials can compete with the artificial in this respect. The average brick withstands heat far better than any kind of granite, syenite or other thoroughly crystalline plutonic rock; limestones frequently pulverise exteriorly and loose sandstone disintegrates into sand on the exposed faces, when subjected to a conflagration which would not have the slightest effect on bricks. Certain varieties of sandstone, and slate slabs, however, are as good as ordinary bricks (not fire-bricks), and are capable of withstanding any heat likely to be generated during the greatest fires.

GENERAL BUILDING NEWS.

NEW CHURCH, STAMFORD HILL.—The foundation-stone was laid on Whit Monday of the "Ark of the Covenant" Church, in Rookwood-road, Stamford Hill. The building, on plan, is a parallelogram, 60 ft. long by 36 ft. wide, intended to be "the same price as the church in the neighbourhood." It will have an apse at the east end, and a tower and spire at the west, which faces Rookwood-road, and forms the principal entrance to the church. The building will seat between 300 and 400 worshippers; and, underneath the eastern portion is a large class-room, with vestry and heating-chamber. The walls are to be painted with brick faced externally with Bristol stone, of a soft blue tint, with dressings of Portland. The spire to be entirely of Portland stone, and to rise to a height of about 155 ft. Outside, upon the buttresses of the tower, and in the place of pinnacles at the base of the spire, as well as internally, under the principals of the roof, will be represented, in sculpture, the "Four Living Creatures" (Ezek. i. and x., and Rev. iv.); and under their feet will be sculptures representing Death, Sorrow, Crying, and Pain. There will also be expressed, in the stained glass and the sculpture, a symbolic picture of the New Creation, the lion and lamb lying down together, &c. The architecture of the church is "decorated" English, early fourteenth-century period, but in some of the internal fittings, and in the boundary fences, the later Gothic and Classic elements will be blended, "so as to express that Jesus Christ, revealed in judgment, as the Son of Man, is the Lord of the whole earth." (This seems certainly a new effort in symbolism.) Internally the church has an open timbered roof, of massive design, in one span, of hammer beam construction, with the sides arched from the hammer beams. There are no pillars. The fittings are intended to be of oak. The architects are Messrs. Joseph Morris & Son, of Reading; and the contractor has been under the management of Mr. Richard Silver, of Maidenhead.

HULME GRAMMAR SCHOOL, OLDHAM.—On the 30th ult., Earl Spencer opened the Hulme Grammar School, at Oldham. The schools have been built to accommodate 250 boys and 150 girls on a plot of land (about eight acres in extent), bounded by Manchester-road, Frederick-street, Hulme-street, and Windsor-road. The basement floor contains a gymnasium, which will be used by both boys and girls, with dressing-rooms for each, a workshop for the boys, and a recreation-room for the girls; separate dining-rooms are provided, and drying stores for wet clothing, fitted up with radial borers. There are staircases to the ground floor, one at each end, which, together with the corridors and gymnasium, are lined with glazed brick dados. On the ground floor are separate entrances, with offices or waiting-rooms, private rooms for use of the master and mistress, with lavatories, &c., to same. The cloak-rooms and lavatories for the boys and girls are placed near the entrances. There is a central hall, capable of seating about 600 persons, with corridors round same on three sides, from which is access to the various class-rooms, thirteen in number. All the class-rooms have raised galleries, and are lighted from the left. A space of 15 ft. superficial and a separate desk is provided for each scholar. A chemical laboratory is provided, and is fitted up with benches to accommodate thirty-six students working at a time. There is also a preparation room adjoining the laboratory, and a chemical lecture hall. The lavatories are in close proximity to the back entrances. The building is built with Ruabon bricks, with red terra cotta dressings in tracery labels, string courses, copings, &c., with beds and sills of stone. The roofs are covered with Welsh slates and ornamental red ridges. The whole of the floors are concreted, and laid with wood blocks (except the entrances, which are tiled). All hollow floors have steel joists and girders, all the corridors bricks, with red terra cotta dressings have tiled dados, and the large hall and class-rooms, &c., have dados in timber. The whole of the inside joiners' work is of the best selected red deal, stained and

varnished. The whole of the rooms are heated by hot water, low pressure, having ornamental radiators fixed in different parts of the rooms and corridors. Ventilation is effected by fresh air inlets with Tobin's tubes, and with outlets in ceiling connected with a large exhaust ventilator on the main roof of the hall. The work has been carried out under the designs and under the superintendence of Mr. John W. Firth, architect, of Oldham.

FREE LIBRARY, CAMBORNE, CORNWALL.—A free library was opened at Redruth a short time since. The library, which stands in Clinton-road, almost immediately opposite St. Andrew's Church, was built by Messrs. Symons & Son, of Blackwater, from plans prepared by Mr. James Hicks, Redruth.

TRINITY PRESBYTERIAN CHURCH, NEWCASTLE.—The foundation-stone of the new Trinity Presbyterian Church, in Northumberland-road, Newcastle, was laid on the 31st ult. The church is entered from Northumberland-road, through a porch into a vestibule, from which open two cloak-rooms. Access to the church can also be obtained from the hall entrance in the side street, also to the gallery by stairs which would be used in case of panic or after service as a means of exit. The organ, which is recessed on one side of the choir space. The galleries are so arranged that the bulk of the seats are placed near the pulpit the remainder of the gallery being purposely kept of slight projection, and extending over side corridors on the ground floor. No columns are used in the church.

The extent of the accommodation is as follows:—Ground floor, 595; gallery, 355; choir, 60. There are also halls, vestries, and ladies' rooms. A corridor separates the church from the hall. It gives access to the church and halls on the ground floor, and contains the staircases leading direct to the galleries of both buildings, as well as to the ladies' and elders' vestries. Cloak-room accommodation is also provided off the corridor nearest the entrance to the smaller hall, which latter has been planned to be used in connexion with the larger hall. The main entrance to the school or hall is near the low end of the side street. The infants' class-room opens direct from this hall. At this end of the building are placed the caretaker's rooms. The hall is 62 ft. 6 in. by 44 ft. 6 in. in accommodation on the floor 58 and in the gallery 80, which also contains 13 class-rooms for 208 children. The church and large hall will be warmed by means of circulation of hot water in pipes on the low-pressure system. The exterior walls of the church and hall will be of Kenton and Windy Nook stone. The contract for the whole building has been let to Mr. G. H. Maule, of Newcastle, who will carry out the works from the plans and under the supervision of the architects, Messrs. Marshall & Dick, their plans being selected in open competition.

CHANCEL SCREEN, CHRIST CHURCH, PLYMOUTH.—On the 2nd inst. the dedication of a new chancel screen of oak, given in memory of the late Mr. James Edgcombe, took place in Christ Church, Plymouth. The work has been executed by Messrs. Hems & Sons, of Exeter. The new screen and other additions to the church have been carried out under the direction of Messrs. Keats & Coath Adams, architects, of Plymouth.

FREE LIBRARY, CAMBORNE, CORNWALL.—A free library has recently been opened at Camborne, and has been erected by Messrs. Symons & Son, Blackwater, from the designs of Mr. Silvanus Treval, Truro.

REERDOS, ST. MATTHEW'S, NEWCASTLE.—On the 30th ult. at St. Matthew's Church, Newcastle, a reredos, recently put into the church in memory of the late Mr. R. J. Johnson, F.S.A. F.R.I.B.A., was dedicated. The reredos, which is from the design of Messrs. Hicks & Charlewood, Newcastle, is, with its super-altar and gradine, executed in Caen stone, and stands about 11 ft. above the altar, its width being identical with the length of the same. The general surface of the new work projects slightly in front of the side panelling already in existence, the central portion being further projected. In this central portion there are a range of niches on a tracery base, and these niches are intended for figures of adoring angels. Immediately over the centre of this rises the cross with the figure of our Lord crucified; the side niches at the foot having figures of the Virgin and St. John. The two spaces over the arms of the cross have panels representing ministering angels. Above this and over the canopies is a carved cornice and open cresting, the severe line being only broken in the centre for the crowning feature, our Lord, in majesty, surmounted by a carved canopy. On each side of the central portion is a double range of niches, three tiers in height, each with its pedestal and canopy. The reredos is the gift of some of Mr. Johnson's personal friends and relatives. The figures have been carved by Mr. G. W. Milburn, of York, all the rest of the work being executed by Mr. Robert Beall, of Newcastle, from the details and under the superintendence of the architects.

CATHOLIC CHURCH AND SCHOOL, NEWPORT, MON.—The Catholic Bishop of Newport and Mentvia, Dr. Hedley, laid the foundation-stone, on the 3rd inst., of a new Catholic school and mission church at Maindee, Newport. The schools are to be built with pressed brick, with dressings of Bath stone and Ebbw Vale buff bricks. The style of architecture will be Gothic. School and class-room accommodation will be provided at

present for about 130 children, on the ground-floor, with a room for the teachers, necessary lavatories, &c. The first-floor will be used temporarily as a chapel while the preliminary steps are being taken and a church built on the adjoining piece of ground. This first-floor will be so arranged that it can be converted into a school and class-rooms when the church is finished. The contractor for the building is Mr. Dyson Parfitt, of Maindee, whose tender was about 25000. Mr. F. R. Bates, of Newport, is the architect.

SCHOOL, CORFE CASTLE.—The foundation-stone has just been laid of new schools at Corfe Castle. The new premises, which are to accommodate 170 children, will consist of a main "mixed" school-room, 60 ft. by 26 ft., a class-room, 24 ft. by 20 ft., and boys and girls' cloak-rooms on either side of the entrance. The walls are being built of Swanage stone, and the building will be roofed with red Broseley tiles, and surmounted by an oaken bell-turret. Mr. W. J. Fletcher, of Wimborne (the County Surveyor), is the architect, and the builder is Mr. W. J. Chisholm, of Bournemouth.

HOUSE, PARK-LANE, LONDON.—The freehold property at the corner of Great Stanhope-street and Park-lane, formerly belonging to Mr. John Malcolm, has recently changed hands, and the house will be rebuilt at once for the occupation of the new owner, from designs by Mr. T. H. Smith, architect.

COTTAGE HOSPITAL, LISKEARD, CORNWALL.—The Earl of Mount-Edgcombe recently laid the foundation-stone of a cottage hospital which is being erected at Liskeard. The hospital is being erected at Tremedden, on the outskirts of the town. When completed the building will comprise an administrative block in the centre, and wings on the right and left. The east wing will contain a ward for district men, and the west wing for three women, besides an accident ward. There will be in addition two smaller wards, intended, when not otherwise used, for private patients. A special feature of the building will be the provision in the centre block of three bedrooms and sitting-rooms, which will be occupied as a home for parish nurses in the Liskeard district. The walls are being built of local stone with brick dressings, and the internal fittings will be of pitch-pine. The work is being carried out by Messrs. J. Symonds & Son, of Blackwater, from the designs of Mr. J. Hicks, architect, Redruth.

BOROUGH CLUB, NOTTINGHAM.—The Nottingham Borough Club has been erected in King-street. Several architects of the town were invited to send in competitive designs in October, 1893, and the plans of the late Mr. Geo. E. Statham were selected. Upon that gentleman's death, the directors placed the work in the hands of Mr. Gilbert S. Doughty, architect, of Nottingham, Mr. Thos. Barlow, of Nottingham, being the contractor. The building has a frontage of 50 ft. to the new street, composed of red bricks, with white Hollington stone dressings and carved bands, the roofing being of red tiles. Internally a wide staircase leads from the entrance hall, beside which on the ground floor are a smoke- and reading-room, writing-room, visitors' room, and lavatories. Public and private dining-rooms are placed on the first floor, with card-room, the manager's office, and the domestic offices. On the second floor are the billiard-room, a private card-room, and the corridor with lavatories, bath-rooms, &c., and to the rear on this floor also are the kitchen, the scullery, the still-room, and other departments of supply. The top floor is reserved entirely for the housing of the management and staff of the building. The floors of the hall, corridors, &c., are of marble mosaic, and glazed tiles line some of the apartments. Generally, the interior decorations are of Indian red, buff, or brown. The building is lighted by electricity. Mr. Joseph Blackburn, of Nottingham, installed the electric light, and Mr. Charles Taylor was the decorator.

FREE LIBRARY, TRURO.—The foundation-stone was recently laid of a free library at Truro. The building will measure about 53 ft. by 45 ft. externally. Internally, the ground-floor will contain a ladies' room, a boys' reading-room, a general reading and periodical room. On the first floor there will be a lending library room, 41 ft. 6 in. by 20 ft., with counter and borrowers' lobby, a reference library, with a bay-window, and a librarian's or committee-room. Above this, on the second floor, will be attics for the storage of papers, books, &c. The designs have been prepared by the Mayor of Truro, Mr. Silvanus Treval, architect.

SANITARY AND ENGINEERING NEWS.

MACCLESFIELD SEWERAGE.—The Local Government Board have now given their sanction to an application made by the Macclesfield Corporation to borrow 60,000l. for works of sewerage and sewage disposal. The scheme includes an outfall sewer to convey the sewage to a site three miles beyond the town, and precipitation works and an irrigation area of fifty-nine acres. The object of the scheme is to purify the river Bollin, which is now polluted by manufacturers' refuse. The engineer to the scheme is Mr. W. H. Radford, C.E., of Nottingham.

SEWAGE DISPOSAL, RAUNDS (NORTH HAMPS.).—At a recent meeting of the Raunds Parish Council, it was unanimously agreed to adopt the "Universal" Company's system (the "Ives" patents) for the

disposal of the sewage of the district. Mr. E. Sharman, C.E., of Wellingborough, was instructed to prepare the necessary plans to place before the Local Government Board. The total scheme will cost about 4,500*l*.

SEWAGE DISPOSAL, STAFFORD.—On the 31st ult. Colonel W. M. Ducat, R.E., Local Government Board Inspector, held an inquiry at the Guildhall, Stafford, relative to the application of the Town Council for sanction to borrow money for purposes of sewerage and sewage disposal. The plans and scheme have been prepared by the Borough Surveyor (Mr. Blackshaw), in consultation with Mr. Wilcox and Mr. Bagnall, the Chairman of the Sewerage Committee. At the request of the inspector, Mr. Wilcox proceeded to explain the scheme and the method of treatment of the sewage. He stated that the total area of the farm was 138 acres 36 perches, of which it was proposed to prepare at once 40 acres for downward filtration purposes. He stated that the land was admirably adapted for sewage treatment, being a light, loamy soil, and sand and gravel subsoil. The whole area would be underdrained at a depth of 6 ft. The method of disposal proposed to be adopted was chemical precipitation in tanks, followed by downward intermittent filtration. The sewage would be lifted from the depot to the precipitating tanks, which would be four in number, having a capacity of about 350,000 gallons. These tanks would be so arranged that they could be worked on the quiescent or continuous process, and would be built above ground for convenience in gravitating the sludge to the sludge-beds, where it would be air-dried and incorporated with the soil. The nearest house to the sewage tanks was about 500 yards away, so that no nuisance was likely to be experienced. Mr. Wilcox then gave the inspector particulars of the pumping machinery and other works at the depot. The Town Clerk mentioned that Dr. Blumer, the Medical Officer of Health, had inspected the site, and cordially approved of it. The inquiry then concluded, and the inspector afterwards inspected the site in question.

THE GLASGOW WATER SUPPLY.—We are informed that at a recent meeting of the Water Committee the engineer reported that the quantity of water at present drawn into the city exceeded that at the corresponding period of last year by nearly four millions of gallons per day. This great increase in the consumption by the city, coupled with the short amount of rainfall there has been since January 1, has induced considerable anxiety as to the future maintenance of the supply to the city during the summer. The citizens should take note of this, and exercise the strictest economy in their power in the use of the water, or otherwise there may be something approaching to a water famine if the summer continues to be a dry one. The engineer thinks that there must be a large number of lead pipes supplying houses which burst during the late intense frost, and which have not yet been discovered. It would probably lead to the detection of these if house proprietors would instruct their plumbers to make a thorough examination of the lead service-pipes connected with their properties.—*Glasgow Herald*.

DRAINAGE WORKS, UFFCULME, DEVONSHIRE.—Major-General Crozier, R.E., held a Local Government Board inquiry a few days since respecting an application by Tiverton Rural District Council for permission to borrow 1,500*l*. for a scheme to divert the sewage of Uffculme from the River Culm. Mr. Liddalls, the engineer of the scheme, explained that the town is drained by means of brick and stone sewers, which also received the storm and surface water. The new sewer would be 9 in. and 6 in. in diameter, of best quality stoneware cement-jointed pipes. Ample means of flushing and ventilation would be provided. The sewage would be used on three fields, containing about 20 acres, on the broad irrigation system, during the eight months irrigation operations are carried on, and during the remainder of the year it would be dealt with by chemical precipitation and filtration on the international plan. Mr. Smith, Weston-super-Mare, who represented Rev. S. Bennett, owner of Grantlands, said the sewage would be deposited within 300 yards of Mr. Bennett's residence, which he had considerably improved, and if brought so near his house he should have to leave as he had a delicate wife. The inspector said as to whether these schemes were a success or not or a nuisance or not depended on how they were worked, but the drainage of a town could not be stopped because a gentleman had got a nice shrubbery. Mr. Heard and Mr. Wright, members of the Uffculme Parish Council, contended the scheme was not necessary. The inspector reminded them that these streams were used for drinking purposes both by cattle and human beings.

FROMENADE PIER, TORQUAY.—A new pier has just been constructed at Torquay. Entrance to the pier will be obtained from the Torbay-road and from the Princess Gardens. At the Torbay-road entrance will be two octagon toll-boxes, fitted with double sets of turnstiles and entrance-gates. Close to the entrance will be waiting and cloak rooms, 27 ft. long by 12 ft. wide, with lavatories for ladies and gentlemen; and inside the pier railings is a

large open space, upon which, at some future time, may be erected a pavilion or other structure. From the Princess Parade the pier is approached by a curved incline deck, over a corner of the harbour, 30 ft. wide. The pier is 930 ft. long, with a widened head 136 ft. in length. There is continuous seating the whole length of the pier, capable of accommodating fully 1,000 persons. On the widened head is a band-stand for twenty-five performers, and half-a-dozen shelters. There is a landing-stage at the pier head. The stage is 110 ft. long and 10 ft. wide. There are three levels to the landing-stage—one for high water, another for low water, and the third for the intermediate state of the tide. Off the pier head the water is deep enough for passenger steamers visiting Torquay at all tides. The construction of the pier has been carried out by Mr. A. Thorne, of Westminster; and Mr. H. A. Garrett, A.M.Inst.C.E., designed the pier, and has personally superintended its construction.

STAINED GLASS AND DECORATION.

WINDOW, ROSSLYN CHAPEL, EDINBURGH.—Two stained-glass windows have just been added to Rosslyn Chapel. In 1887 the late Earl of Rosslyn filled in the centre of the clearstory windows on the north side with a figure of St. George and the Dragon, in memory of the late Mr. Andrew Kerr, architect, who superintended the building of the baptistry, and other work connected with the Castle. At the same time the centre window on the south side was filled in with a representation of St. Michael. It was understood at the time that these two subjects formed part of a series with which Lord Rosslyn intended to fill all the clearstory windows, after the suggestion and design of Messrs. Clayton & Bell, of London; those on the north side consisting of Christian warriors, and those on the south of Old Testament warriors. There have now been added on the left of the centre subject, St. Longinus, soldier and martyr in Cappadocia, fourth century; and on the right St. Maurice, soldier of the Theban Legion, who was martyred with others in 285.

MEMORIAL WINDOW AT ST. SIDWELL'S CHURCH, EXETER.—On the 1st inst. the new three-light south-west window was dedicated at St. Sidwell's Church, Exeter. The window is by Messrs. Percy Bacon & Brothers, of London. In the tracery lights that occupy the upper part of the windows are the forms of angels bearing scrolls. The central and most prominent figure is St. Boniface. On the dexter side-light is a figure of St. Hieretha, a native of Symybridge, in north Devon. She is represented bearing in her hands an exact model of the western tower of Chiltonhampton Church, of which edifice she was the foundress. On the sinister side is St. Sidwell. Above each figure is canopy work, and over this, on either flank, are full-length figures of angels, the one on the south bearing a starry crown, and that on the north a martyr's palm. Immediately under the central figure are the arms of the See, impaled with those of Bishop Bickersteth. The new stonework for the windows was carried out by Messrs. Harry Hems & Sons.

FOREIGN AND COLONIAL.

FRANCE.—The committee for considering the models for the monument to be erected on the Place d'Annee to the memory of President Carnot has selected the design of the sculptor M. Carpeaux. M. Haussoullier, a painter connected with the Ecole Pratique des Hautes Etudes, and M. Pontremoli, architect, and former holder of the Prix de Rome, have left for Asia Minor on a mission from the Department of Fine Arts, to carry out excavations at Hieronda (Didyme) on the site of the Temple of Apollo. The Chamber of Deputies is considering a proposal to raise a national monument to the memory of the soldiers who fell in the war of 1870. The Académie des Beaux-Arts has awarded medals to the following architects:—To M. Debrasse and M. Lechat, for their publication on Epidaurus; to M. Clause, author of a work on "Christian Basilicas and Mosques," and to M. Faure for his *Theories of Proportion in Architecture*.—Several deputies of Paris are interesting themselves in a scheme for the entire suppression of the fortifications of Paris. In a few days the decree will be formally published which suppresses the "Direction des Bâtimens Civils," which will be placed under the authority of the Directeur Général des Beaux-Arts, under the Department of Public Instruction.—It is proposed to construct on the site of the Eden Theatre a large square, to be called "Square de l'Opera."—It is proposed to construct, at Marseilles, an Asylum for "Invalides du Travail," at an estimated cost of 750,000 francs.—The death is announced, at the age of 79, of the sculptor Etienne Montagny, born at St. Etienne. He had obtained medals in various years since 1849, and also the cross of the Legion of Honour.

GERMANY.—The Saxon and Thuringian Industrial Exhibition will be held at Leipzig in 1897. A competition has already been opened for a design for the exhibition hall. Several premiums will be given; the first premium being 325*l*.—Hanover is to have a new museum and a new town-hall.—A new technical college is being erected at Darmstadt from the designs of Professors Wagner and Marx.

MISCELLANEOUS.

MEMORIAL THRONE, NORWICH CATHEDRAL.—On the 24th ult. the Prince of Wales unveiled the Pelham memorial throne in Norwich Cathedral. In a niche on the western side will be placed a figure of the late Bishop Pelham, and in a corresponding recess on the eastern side an effigy representing the first Bishop of Norwich. On the north face of the back panel is a shield bearing the arms of Bishop Pelham, impaling those of the See of Norwich, surmounted by a fleur-de-lis, cornucopia, mitre, and enriched by a band on which are carved the words, "In memory of John Thomas Pelham, 1857-93." The throne was designed by Mr. J. L. Pearson, R.A., and with the exception of the sculptured figures, which are from the chisel of Mr. N. Hitch, of London, the whole of the work has been done by Mr. C. Simpson and Mr. G. Clarke, two of the assistants of Messrs. Cornish & Gaymer, of North Walsham, Norfolk. The armorial bearings were executed by Mr. J. Minns, of Norwich.

IRON SAND.—A peculiar industry in connexion with the granite trade is the manufacture of iron sand. This curious and interesting process is carried on at the Pioneer Ironworks, Aberdeen, as follows:—Into an opening at the top of a firebrick cupola, with an outer casing of iron, are thrown from an elevated stage coke and bits of old cast-iron—railway wagon-wheels, cannon-balls, agricultural implements, &c. A fierce heat is kept up in the cupola by means of fans driven by a steam-engine. The metal when melted finds its way out at the foot of the cupola down a spout, and a powerful steam blast sends it flying in white-hot spherical globules into a brick chamber containing a tank with cold water. On taking off the little door at the observation hole, and peeping cautiously in so as to avoid a hot particle invading the eye, one can see the spherules dropping in a shower on the water, causing a host of tiny explosions. Such is the strength of the blast that the sparks fly out now and then at the chinks of the iron doors at the other end of the brick chamber, and strike the wall 50 ft. at least from the cupola. Among old iron railway chairs are preferred. The writer of this paragraph on his visit saw an old cannon, 12 ft. long, lying on the ground ready to be broken up and cast into the smelting-pot. The melting operations over the water is run off the tank. The spherules are then collected and spread on sloping iron platforms to dry for a day or so. There are seven steam-pipes at intervals to aid in the drying part of the process. The material is then ridden by wire sieves moved by steam-power, and falling down a spout is collected and put up in r.cwt. bags for sale, or stored in the sheds in loose heaps. This portion of the premises is ventilated by a louver ventilator and an iron funnel. It is in the riding that the superiority of the Aberdeen plan over the system prevailing in the United States comes in. At the Pioneer Iron Works seven different sizes are produced, the present retail price of the finest being 6*l*. a ton in Aberdeen. The sizes vary from a very fine powder to No. 1, which about equals No. 6 shot in iron sand is, in fact, generally called chilled shot by granite workers in Aberdeen. Of the intermediate sizes No. 4 resembles clover seed in dimensions, and No. 3 would about equal the pellets known among sportsmen as sparrow-hail. Iron sand is used for sawing and polishing granite. For ordinary steam saws (which are made of mild steel) the largest variety is employed. These saws when in motion are fed with the iron sand and with water. The water washes out the iron sand, which is caught in a box and utilised over and over again until used up. For nice sawing, when the granite is cut perhaps an eighth of an inch thick, to be polished on both sides for fancy caskets, samples, &c., the roughest kind is not used. The three finest grades are used in the first stage of machine polishing. When iron sand is used the stones do not require to be dressed so finely before being machine-polished as they did when sea sand was used. The employment of iron sand enables machine-polishing to be executed about three times as fast as when sea sand was used, and about ten times less of it is necessary. Emery or sea sand is, however, used for hand-polishing in all stages, and emery is also employed in the second stage of machine-polishing.

KNIGHT'S LOCK CLIP FOR SLATES.—This invention, patented by Mr. F. Knight, consists of a clip composed of a dovetailed base surmounted by a hook, and the whole is made of a composition of lead and antimony. The base fits into dovetailed slots cut purposely on either side of the slate by a double-action register slotting-machine, designed for the purpose, and also patented by the inventor. When the slates are brought together along the course, the clip becomes dovetailed between the two adjoining slates, leaving the upper part or hook to receive the overlapping slate of the course above, so that when this is fixed, each slate becomes locked to its neighbour on each side and at the base, besides being locked at the head at the usual manner. The invention, in so far as it leads to the greater security of the slates, is a good one, and is especially of value in any exposed position. It has advantages, again, in the repairing of slate-roofs, as, by a slightly modified treatment of the same clip, shown by the inventor, slates, when broken by

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The Builder.

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ILLUSTRATIONS.

"Monument aux Morts": exhibited at the Champ de Mars Salon, Paris.—M. Albert Bartholomé, Sculptor.....*Extra Large Ink-Photo.*
New Church, Petworth, Sussex.—Mr. F. A. Walters, F.S.A., Architect.....*Double-Page Ink-Photo.*
Studio of Mr James Tissot, Château de Buillon, France.—Mr. J. M. Brydon, F.R.I.B.A., Architect.....*Double-Page Photo-Litho.*

Blocks in Text.

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A Proposed New Art.



N immense concourse of visitors occupied St. James's Hall on Thursday evening last week, in response to the invitation of Mr. and Mrs. Wallace Rimington to a conversazione for the purpose of exhibiting what professes to be nothing less than an introduction to a new mode of artistic expression. This is perhaps the only occasion on record when a deliberate attempt has been made by an individual experimenter to inaugurate a new art; and on this account alone such an event ought not to be passed over without due attention, though perhaps we may doubt whether any form of art which has obtained general acceptance with mankind has ever really been set going by individual experiment and persuasion. The evolution of all existing forms of art has been the result of slow and tentative processes extending over many generations. Rome was not built in a day, and new arts do not spring up in a moment at the bidding of any self-conscious contrivance. We can hardly fancy the arts of architecture or music having been started at an evening lecture.

Still there is this to be said for Mr. Wallace Rimington's demonstration, that it is a first attempt to put into definite form an idea which has been floating in men's minds more or less for a good many years past. The idea is that a form of artistic expression and creation might arise from changes and combinations of colours in movement and succession, and in obedience to a principle of rhythm and harmonic relation. That some such form of art may be possible, and may be capable of very high development in the future, is an old idea with us, long before the inditing of the passage from a contemporary writer which Mr. Rimington quoted in support of his position. But it is of little use to try to force it. No man, we might even say no generation, can say deliberately "we will make a new art." A new application of an existing art may be made by individual genius, but a new art takes time to grow, and will not be hurried.

Nor do we think Mr. Rimington is quite on the right track, although the pains and

expense which he has given to the practical elucidation of his theory deserve more serious recognition than they seem to have received. Various daily papers have reported on the meeting, in a spirit of curiosity, but we have not observed that any attempt has been made to consider seriously the principle of treating colour which was proposed, or the mechanical means for carrying it out.

Mr. Rimington has been attracted, as others have been, by a certain physical analogy between the proportionate vibrations or wave-velocities in colour and those in musical tones. He fortifies himself by quotations from various scientific exponents of the physics of colour—Ganot, Herschell, Tyndall, &c.—in the idea that there is a direct analogy between the musical scale and the colour spectrum. "A red light is due to a comparatively long undulation and corresponds to a deep sound; while a violet light is due to a short undulation and corresponds to an acuter sound" (Ganot). He quotes Dr. Babbitt (on "Light and Colour") to the effect that it has been demonstrated by spectrum analysis that there are new octaves of colour above the violet rays, "just as high octaves of musical tones are a repetition of the lower ones." Herschell had suggested the same idea in remarking that there was a tendency to redness in the extreme violet end of the spectrum, as if this were the commencement of a fresh spectrum series which was beyond our powers of vision. In other words, we can hear several octaves of tones, we can only see one octave of colour, but the proportionate series might be seen to repeat themselves if our vision were capable of greater delicacy of perception.

All this seems rather too much a mixture of fancy with science. Ganot's assertion that red corresponds with a low tone and violet with a high tone, is merely true in the physical sense that the vibrations of violet are nearly (not exactly) double those of red, as the vibrations of the upper octave note are exactly double those of the next lower octave; to say that there is any correspondence in an æsthetic sense is merely an assumption of individual feeling. And even in the physical sense, the mere fact that the correspondence is not quite exact is enough to put one on one's guard against pushing the analogy too far. The red end of the spectrum, according to the table supplied by Mr. Rimington as

an appendix to his printed lecture, gives vibrations which are to those of the ultra-violet end as 990 to 1893. This is supposed to correspond with the relation between the lower note of a musical octave and the last note before reaching the upper octave—i.e., between any C and the B above it. But the ratios for the musical tones are as 100 to 1915. The colour scheme is assumed, according to Herschell's suggestion, to begin over again with a new red representing 200, but which we cannot actually see. Even supposing this, however, to be the case, we have 99 to 200 for the colour-octave repetition, and 100 to 200 for the musical one. This is a very slight difference, but in physics we want exact conformity; and it should be borne in mind that, in regard to tones, the physical basis of our musical scale, so far as it goes (it does not go nearly so far as is popularly supposed), is precisely exact in its proportions; the vibrations of a note compared with its octave above are precisely as 1 to 2, those between any note and its fifth above are precisely as 2 to 3, and the slightest deviation from these proportions produces the sense of "out of tune." We cannot, so far, find that there is any such precision in regard to the vibrations of colours which are felt to be harmonious or the reverse.

This may be because our eyes are not at present trained as our ears are. But, at all events, we are not in a position to establish close physical analogies between a musical scale and a colour scale. Mr. Rimington's attempt to do this is entirely empirical. He proceeds as if our scale of musical tones rested on a necessary physical basis and proceeds to cut up the colour spectrum into a series of divisions corresponding to the divisions of the musical octave, and arranged so as to present nearly the same ratio in rate of vibration. But the form of our musical scale is quite arbitrary, except in regard to certain landmarks, as they may be called in it, which are fixed by physical conditions. As Dr. Pole has pointed out ("Philosophy of Music"), the number of possible musical tones being practically infinite, no treatment of sound as an art was possible until certain steps in sound had been agreed upon (hence called the "scale" = *scala* = "ladder" of fixed tones) which the ear could easily discriminate. The octave is a physical necessity—a fresh starting-point, where the upper sound is felt

by the ear to be the same as the lower one in an acuter form. But there is no physical basis for the division of the octave into eight degrees. There might have been more; or fewer. Still less is there any reason why a colour scale should be divided in the same way. On the contrary, there seems every reason to think it would be susceptible of much more numerous and delicate divisions than are to be found in the musical scale.

That appears to us to be one mistake at the outset. The manner in which the use of a colour scale was exhibited to the meeting at St. James's Hall was by means of a cleverly-devised "colour organ," played with keys like those of an organ, the effect of which was to throw blended combinations of colours on a white screen hung at the end of the hall; the room, of course, being darkened. The proposed analogy between music and colour was illustrated by pieces of music being played by a band or on the piano, and accompanied by the colour changes on the screen produced by pressing the corresponding keys on the colour organ. The colours produced were often very beautiful, and they certainly, at all events in slow changes, enhanced the effect of the music. But it is of no use to propound to us a new art which can only stand as an accompaniment to another art; and if we had had the colour changes without the musical accompaniment they would have had little interest or meaning.

That is where the ingenious projector has missed another point. He has missed the real analogy between musical art and a possible colour art. To make a colour art which would take its place as a separate art, we must have something analogous to form, besides a mere blending of colours. In music the element of form is supplied by melodic design, and there is nothing analogous to this in Mr. Rimington's colour harmonies. As far as they can be compared with music, his colour changes and combinations resemble, both physically and aesthetically, the kind of musical art which could be produced by mere successions of harmonies without any melodic form at all. That will never do.

The idea which we formed many years ago as to a possible art in combinations of colour was that of what might be called moving symphonies in colour, in which successions of decorative forms, or defined combinations of colour, all subordinate to one main idea, should succeed each other on a screen, in obedience to a rhythm of succession as well as a harmony of design. It would be something like the kaleidoscope carried a great deal further, and regulated by design and not by accident. That an art of this kind will be eventually evolved we feel almost certain, and that it might give scope for effects and beauties almost undreamed of. But there is a long path to traverse before we arrive at anything like that. The first instruments for its production are not even thought of yet.

We may thank Mr. Rimington, however, for giving an impetus to the idea that an art of moving colour is possible, and leading people to think about it; and his colour organ, as far as it goes, is a very ingenious contrivance, of some interest in itself. What we maintain, however, is that he has started on the wrong lines, and such as will hardly lead him to any definite goal. We need make no apology to our readers for touching on the subject here. The idea of an art dealing with colour, and addressed wholly to the sense of sight, is one which must interest all artists; the idea of its being in any way specially connected with music, which is not a subject within our limits, is the accidental result of the manner in which it was regarded and treated by the exponent who called together the meeting; the connexion, as we have shown, is purely arbitrary. That the subject will have interest for some of our readers may be inferred from the presence of a good many well-known architects at Mr. Rimington's demonstration.

THE COMPENSATION TO WORKMEN (ACCIDENTS) BILL.



HE promoters of the Compensation to Workmen (Accidents) Bill can hardly expect, even if it is favourably received by Parliament, that it can become law during the present Session, one which is not likely from various causes to be fruitful in legislation. But this measure, even though it may be regarded rather as an attempt to test public opinion than as a measure which it is seriously intended to push into law at once, deserves the most careful consideration. Its details are few, for it is based on the broad principle that a master is legally and morally bound to compensate a workman when the latter is injured in the course of his employment, save and except only when the workman has been guilty of wilful and deliberate neglect or default. There is a simplicity about this proposed legislation which has much to recommend it, and once the principle of it is allowed to be just and right, there can be no difficulty in carrying out the few necessary details. In the Bill as it stands, the maximum amount of compensation payable in case of death or total disablement is three years' wages, or 150%, whichever sum is the largest. The rates in cases of permanent partial disablement shall, in default of agreement between the parties, be settled by a County Court Judge, but shall not exceed one-half of what would be payable in case of death or permanent disablement. Now, the first point of a practical character which is noticeable in this Bill is, that while it would very largely increase the extent of the employers' responsibility in cases of accidents to his workmen, it would on the other diminish the amount and the uncertainty of the compensation payable. At the present time a master is not liable for mere accidents, but in those cases in which he is under a legal liability, that liability is unlimited: he may have to pay ten pounds or a thousand pounds. It is obvious that the limitation of the amount of compensation is a great advantage to an employer, since it enables him much more easily to safeguard himself against loss by accidents by means of insurance.

We are inclined, therefore, to think that this measure, if it became law, and under certain limitations which will be presently stated, would not enlarge the risks of prudent employers; on the contrary, it would be easier to guard against them. But the question naturally arises, is it desirable that the workman should be thus protected, and that the loss which arises from accidents should in all cases fall first on the shoulders of the employer, and subsequently on those of the consumer? For it is obvious that the cost of insuring against injuries to workmen must become part of the cost of manufacture or production, and that it is the public which in the end pays any increase in the rates of wages or in amounts which are of the same nature. The law has long ago recognised the principle that a master may be responsible for injuries to workmen and to third parties, even though he is personally wholly free from blame. Once this doctrine is recognised, it is doubtful if any practical advantage is to be gained by narrowing its operation. The practice of masters insuring against losses which they may incur by having now, in some cases, to compensate workmen is daily growing. The effect of such a Bill as this becoming law will do no more than increase this practice, and enlarge the already existing legal doctrine of liability. Undoubtedly it is the duty of prudent workmen to insure against accidents, and it is also desirable to make workmen careful in their daily occupation. But it is certain that in no long time the non-liability of the master, which arises from what is known as the doctrine of common employment, will be ended. Mr. Asquith's Bill of last Session would have accomplished this, and it was lost, not in consequence of this proposed change, but

because the Home Secretary would not allow workmen to contract themselves out of the Act.

The question then arises, Is there any practical advantage in excluding pure accidents from the category of matters which gave rise to a liability on the part of an employer to compensate a workman? It may fairly be argued that if the master is to have so large a responsibility thrown on him, the workman should not receive the same rate of wages after the law was altered as before. To some extent the rate of wages must depend on the risks of the employment, and if a workman is entitled to receive compensation from his master for any injury which he may receive, unless it be caused by his own "wilful act or wilful default," this is a reason why he should be paid lower wages than if he himself were liable to go without compensation in case of accidents; whether, however, this result would ensue is extremely doubtful. The amount of premium, however, which a master would have to pay to an insurance company if accidents were the subject of compensation would, we imagine, be but little greater than if they were not. When, therefore, we are so near coming to a complete and final measure in regard to the liability of employers for injuries to workmen, we are inclined to think that it would be the most practical solution to include accidents, as is done in the Bill which has been introduced by Mr. Forwood and others. It may be admitted that any such change in the law places workmen in a more favourable position than other members of the community. It is possible that this objection may be met by placing some limitation on the trades and employment in which workmen should receive compensation for accidents as distinguished from acts of negligence on the part of some person in authority over them, or on the part of a fellow servant. As the Bill now stands, the liability of the master is quite unlimited as regards employment. For the Bill applies to men engaged in dangerous trades, and those employed in occupations which may be considered, generally speaking, as free from danger. In any event, the liability of the master to compensate a workman if injured by an accident should be limited, we think, to some extent, according to the character of the work. Otherwise the draughtsman in an architect's office who slips off a chair and injures himself would be as much entitled to compensation as a builder's foreman who falls off a scaffold. This practical example will show the need for some kind of limitation.

The weak spot in the Bill appears to be in the eighth section, which enacts that a workman, or his personal representative, after the occurrence of an injury, and before assenting "by words, writing, or conduct" to claim compensation under this Act, may give written notice to the employer that he does not claim compensation under it. Thereupon he is at liberty to pursue any remedy which he might previously have had. The result of this section would be that if a workman thought he could get more out of an employer by ordinary legal proceedings he would throw the Act overboard. But from what we have already stated it will be clear that if the liability of the master is to be extended to injury from pure accidents, then the Act should alone be the law governing these questions, and that a workman should not be able to have other remedies. But it is certain, as we have said, that this Bill cannot yet become law, and it is to be hoped that before next year both employers and employed will give it careful consideration and enunciate their views upon it.

NOTES.



WE are very glad to see that there appears to be now some chance of the sculptured decoration of St. George's Hall, Liverpool, being completed. A complete scheme has been sketched out by Mr. Stirling

Lee, who executed the first panels some time since; it is estimated that it can be completed in ten years, at a cost of about £40,000, or £4,000 a year for the ten years, which does not seem an exorbitant sum for so wealthy a city as Liverpool to spare from its municipal revenues. There seems, however, to be rather a desire that some wealthy individuals should personally find the funds or a portion of them; and possibly it is to leave a margin for the wealthy individual that the first vote has been for 3,000l. only, not for four. Mr. Lee proposes bronze equestrian groups on the pedestals flanking the steps of the end portico; a series of panels on the east side of the portico representing "The Growth of Justice" and "National Prosperity," and over these panels statues (on the bases between the square columns) representing "Spirits of Light and Virtue" governing and inspiring Justice and Progress. In the pediment, "The Triumph of Commerce" (does this refer to the existing sculpture in the pediment?); on the panels round the concert-room, "The Nine Muses," flanked by "Music" and "Nature"; on the panels on the corners of the building, "The Scientific Discoveries of our Time"; on the pedestals between the columns on the west side, "The Attributes of Municipal Government"; while the four groups facing the four corners of the globe will represent "The Spread of Civilisation and Colonisation." This is a fine scheme, and we hope it will now be carried out without further delay or postponement. If it is at last accomplished, one cannot but feel that it will be mainly due to the perseverance and persistence of Mr. P. H. Rathbone in urging the matter on his townsmen, and his liberal example in providing funds for the execution of the first panels. We do not always agree with Mr. Rathbone's views on art, but he is at all events an enthusiast, and his enthusiasm has succeeded in surmounting a great deal of opposition, arising more, perhaps, from indifference to art than active hostility.

IT is satisfactory to find the Government giving a prominent place to such useful legislation as the Conciliation Bill. This measure passed the second reading on Monday, and will in due course be considered by the Standing Committee on Trade. The President of the Board of Trade, in explaining the objects of the Government, and dealing with the various objections made to their proposals, acknowledged that the measure is really only a tentative scheme; and it is certainly desirable that it should be left open to such modification as may be suggested by experience of its working. There is a danger attaching to such legislation as this, of adopting hard-and-fast rules which may repel disputants, a position which Mr. Bryce and others fully recognised. We cannot agree with the speaker who regarded the Conciliation Clause of the Railway and Canal Traffic Act as a failure, although, in some cases, no satisfactory settlement was arrived at. A sufficiently large number of successes have been scored by the Board of Trade in their mediatorial capacity to prove the value of this clause of the Act. It was argued on Monday that the Board already possess much of the power which this Bill confers upon them of bringing disputants together. But it is one thing to have power to act when it may appear desirable, with equal liberty to abstain, and quite another to be under an obligation to take certain steps at the outset of a dispute, without waiting for it to reach an acute stage. The existence of a recognized and properly-constituted means of mediation must necessarily facilitate the settlement of strikes and lock-outs. Several cases might be quoted to prove this, much being irrecoverably lost to both parties while casting about for a mediator or vainly waiting for a volunteer. Much remains to be discussed by the Committee, the debate on the second reading foreshadowing considerable difference of opinion on matters of

detail, although there was a gratifying unanimity as to the principle of the measure.

THE new number of the "Antike Denkmäler," just issued (ii, 2, 1895), is an unusually rich one, and deserves the special attention of English archaeologists owing to the number of plates devoted to the publication of monuments in the British Museum. Three are devoted to the frieze-reliefs of the Mausoleum. As long ago as 1877, Professor Michaelis, with the co-operation of Sir Charles Newton, had a complete set of drawings made by the artist of the Archaeological Institute, Ernst Eichler, but owing to difficulties in the mechanical reproduction of the extremely delicate pen-and-ink work the publication of them was set aside for the time. Since then a good many portions of the frieze have been published in various books and monographs as Greek art, but the complete publication of all the fragments was never undertaken till now, when the drawings of Eichler at last see the light. In the text that accompanies the plates, Professor Michaelis gives briefly the bibliography of the subject, and discusses the technical peculiarities of each of the three friezes, the Amazonomachia, the Kentauromachia, and the Chariot Race; he also, in the text, gives drawings of the plinth on which the Amazon frieze rested, with accurate reproductions of the curiously-varying profile of the cymatium that runs beneath it. The drawings will form the basis of a full discussion of the whole of the Mausoleum, to appear shortly in the "Jahr-buch," from the pen of Dr. Franz Winter. Besides these plates devoted to the Mausoleum, Dr. Dümmler publishes, in exact coloured facsimile, some of the curious vase fragments brought to the British Museum from Defenneh, and Mr. Theodor Wiegand publishes a black-figured hydria, also in the British Museum, with an interesting representation of women drawing water at a fountain. In it he believes we find our best help to picturing in imagination the sort of structure that Peisistratos made for Athens when he turned the simple fountain Kallirrhoe into the complex Enneakrounos.

THE Bradfield College Greek Play, in the theatre on the Greek model formed in the college grounds, has been revived again this year, after an interval of three years; probably it was found impossible to keep it up annually without interfering too much with the ordinary school work. The play, on this occasion, given on Saturday and Tuesday, and announced for repetition on Thursday and Saturday in the present week, was the *Alkestis* of Euripides, which drew an unprecedented number of spectators, probably because the story is better known (partly through Browning's paraphrase) than that of any other ancient drama. As on the last occasion, when *Agamemnon* was performed, we gave a full description and a sketch of the theatre (see the *Builder* of July 2, 1892), it is unnecessary to return to that now. The performance was a very good one, and greatly to the credit of those who took part in it; Mr. B. Wood-Hill played the part of Alkestis with a great deal of feeling, and the representation by the head-master (Dr. Gray) of Admetus was a very highly-finished piece of acting. Nor must we omit the charming singing in the part of the child Eumelos (the son of Admetus) by one of the younger boys, L. E. Brakspear. Some additional interest was given to the performance by the treatment of the musical accompaniments under the direction of Mr. Abdy-Williams, now the instructor in music at the College, who has made ancient Greek music a special study. The instruments, *cithare* and *auloi*, are copied from ancient representations, as far as design and make are concerned, and produce sounds which have a pleasantly old-world effect quite different from those of modern instruments. The *cithara* is a type of stringed instrument seen in many ancient representations, and what most people pro-

bably would denominate a "lyre"; the *aulos* is a pipe with a reed mouthpiece, giving a low mellow tone. The music, without professing to be on imagined Greek models (about which no certainty is possible), was sufficiently distinct from the manner of modern music to assist materially in the antique effect aimed at in the whole representation, and in this sense even its rather melancholy and monotonous character had a value. The practical use of an auditorium planned on the Greek model, with the seats returning past the semicircle in horse-shoe form, leads to the conviction that to many of the spectators of the ancient drama the singing and evolutions of the chorus were the chief attraction, and the interest in the actors on the scene a secondary matter, otherwise the auditorium would surely not have been planned so that the spectators towards the end of the curve could not have seen the stage at all. At Bradfield the Greek plan is adopted, but the spectators avoid the end seats, which are always left empty. Too much praise cannot be given to the admirable system on which everything was arranged for the convenience of visitors, and for getting them punctually into and out of the theatre, and conveying them to the station. Business-like management in such matters makes all the difference between comfort and discomfort. The weather was propitious at the Saturday and Tuesday performances, though on the latter day an overcast sky and an occasional blast of chill wind served to remind the company that open-air theatres are essentially an institution for a southern climate. We hope the Greek plays will be kept up at regular intervals; they are of the greatest interest in themselves, and an admirable source of education to the boys.

SOME pictures recently acquired for the National Gallery include the painting of old Covent Garden, purchased (for seventy guineas) at the sale, last month, of the late Lord Clifden's collection (see our "Note," p. 406, ante); and Hogarth's "Calais Gate." The latter is also known as "Oh! the Roast Beef of Old England," seemingly because a copy of the print was added to the title of a cantata so named. Hogarth crossed over to France soon after the signing of the peace of Aix-la-Chapelle. He was arrested at Calais as a spy whilst making his sketch of the old gate, and the treatment he received served but to intensify the narrow-minded prejudices he entertained, and often imprudently expressed, against everything he saw there. An engraving, by Hogarth and C. Mosley, after the picture was published on March 26, 1749. The gate, of stone, with a drawbridge, opening seawards, had been built by Cardinal Richelieu, who erected the citadel also, in 1635, and belonged to the fortifications, whereof the greater portion was removed for an extension of the town about twelve or thirteen years ago. The picture was sold for 2,450 guineas at Christie's in May, 1891, and is presented to the nation by the Duke of Westminster. The painting of Covent Garden is now stated to be by B. Nebot; in the catalogue of the sale it was attributed to Pugh.

MR. C. H. BELOE, M.Inst.C.E. (the engineer, we believe, to the International Sewage Purification Company), has recently drawn attention* to several improvements which have been effected in the mechanical part of the system, the chief of these being the "Candy" circular precipitating tank, with its highly ingenious and yet simple method of sludge removal. The one which we have seen in operation certainly works well, and as the sludge is extracted only a few inches below the level of the inflowing sewage, the expense of pumping the effluent will in many cases be avoided. The method of applying the same

* "Professional Papers of the Corps of Royal Engineers, 1895."—"Sewage Purification."

principle of sludge removal to existing rectangular tanks is also clever and practicable. Mr. Beloe, however, makes one or two statements about the Scott-Moncrieff system of purification which need correction; the filter-bed required by Mr. Moncrieff for the sewage of 1,000 persons would not be 2,000 "feet square," but only 2,000 square feet (a vast difference), and it does not follow that because the filter-effluent from a household of 10 or 12 persons requires a nitrifying channel 80 ft. long, a "channel between 6,000 and 7,000 ft. in length would be necessary" for a population of 1,000 persons. As well say that if the sewage of ten persons requires a flow of five minutes from the time of dosing it with ferrozene to its entrance into the precipitating tank, the sewage of 1,000 persons will require a flow of more than eight hours!

THE Sowerby Bridge School Board have issued instructions to architects for a competition for new schools for 600 children under the following generous conditions:—No premiums will be given, but the author of the selected plans will be appointed architect to carry out the work; he will be required to supply bills of quantities to the contractors *free of charge*; to dispense with a clerk of works, and take all the work of overseeing the construction; to measure up the work when completed; to hand over to the Board at the completion of the work the plans and specifications; and his remuneration for all this is to be $3\frac{1}{2}$ per cent. on the total outlay. The Board will not adopt any of the designs if not of sufficient merit (of which they are to be the sole and final judges), and will reserve to themselves the right of making any alterations in any design that may be accepted. It is to be hoped that no architect of any standing or respectability will demean himself by sending in plans under such conditions.

MESSRS. BROADWOOD & SONS have had on view last week a grand pianoforte designed and very elaborately decorated in Louis Seize style, from sketches and details by Mr. C. C. Allom. Although this is not so original and striking a design as some decorative pianos which have been carried out by the same firm, it is a very satisfactory one in effect, as the style of design adopted lends itself very well to the constructive lines of a piano-case. The treatment adopted is in panels with delicate carved and inlaid borders, and a filling of marquetry, the majority of the surface being treated in a small diaper inlay in diamond-shaped partitions, each enclosing a delicate little floral design on a groundwork of haw-wood, bordered with kingwood and lines of ebony and holly. Some of the panels are distinguished by larger and more elaborate designs of inlaid floral work. The whole is further decorated with the delicately-proportioned "swags" characteristic of the Louis Seize style, which are gilded, a treatment which is no doubt in keeping with the style, though it seems almost a pity to take away the edge and *finesse* of delicate wood-carving by gilding it. In the side-view of the instrument the projection of the keyboard, with the double curve of the cover, is kept separate from the rest of the design, thus getting over what is always a difficulty in design, in the connexion of this projection with the side of the instrument. The legs, six in number, are arranged in pairs, braced together by cross-ties near the foot, each pair supporting a long bracket or lintel on which the body of the piano rests, thus giving a satisfactory constructive appearance. The treatment of the music desk, with an elaborate floral design in inlay, seems a mistake, as the design must be hidden whenever the desk is put to its proper use, and when not wanted it is better folded down and out of the way. The mistake of decorating the keys, which we objected to in another artistic piano made some time ago by the

same firm, has fortunately been avoided here. Whatever variety and elaboration may be allowed in the general decoration of a piano, the keys should always be left intact; they are essentially for use, not for show, and any disturbance of their simple black and white contrast is apt to trouble the player. Altogether this is a very satisfactory effort in pianoforte decoration, and deserves a record as such.

IT cannot be said that the summer exhibition of the Dudley Gallery Art Society is a very brilliant one; it contains a good deal of work that is of a very commonplace kind, and we fear that the large drawings by the President can hardly be removed from this category. Amongst the exceptions are the drawings exhibited by Miss Rose Barton, all of which are worth attention, though "Cromwell Road" (74) is rather too palpably a leaf out of the book of Mr. Herbert Marshall. Miss Margaret Bernard also shows in her broadly-treated and rather sketchy drawings the feeling and power of a true artist, and Miss Jex Blake's "The Ebb Tide" (199) is an admirable work, showing that the artist has a meaning in every touch of the brush. Mr. F. G. Coleridge's "The Thames at Mapledurham" (293) is an excellent bit of what may be called miniature landscape painting. Among the larger works which rise above the general level are Mr. Ash's "Evening" (1) and Mr. Boyd's "Kylmore, Lake Connemara" (247). M. Block's highly elaborated still-life subjects in the shape of drawings of collections of old books, &c. (97, 113), are better than ever, and in their own way are quite perfect. Miss Caroline Turle exhibits a very good drawing of the Temple of Niké Apteros (306), taken from an unusual standpoint, showing the flank of the Temple as seen by a spectator standing with his back to the Propylæa and looking outwards; the drawing is both broad in style as a watercolour and correct in architectural delineation. The same lady exhibits a good drawing of the "Temple of Segesta" (81). Other architectural subjects in the exhibition are much less satisfactory. In Mr. Williamson's "Old Square, Lincoln's Inn" (320), the buildings are all out of perspective; and Mr. Medlycott's drawings of "St. Ouen" and "Westminster" (56, 67) are absolutely discreditable in drawing, and would never have been hung by any committee who knew anything about architecture, and its representation in drawing. The cornice lines of the octagon lantern of St. Ouen are drawn as if it were a polygon or a circle; in "Westminster" the Victoria Tower is out of the perpendicular and the turret at one of the receding angles is actually shown higher than the one at the angle nearest the eye, a fault implying a want of the most elementary knowledge of perspective. That architectural subjects may be treated for the sake of general colour and effect, and not for the sake of showing architectural detail, we quite admit, but a necessary preliminary to this is to learn to give the main lines and character of the architecture correctly, and in true perspective, otherwise the result can only be a palpable bungle. Mr. Medlycott appears to have taken up architectural subjects without learning to draw architecture; he had better learn this before going further, or he will be likely to hear of it again.

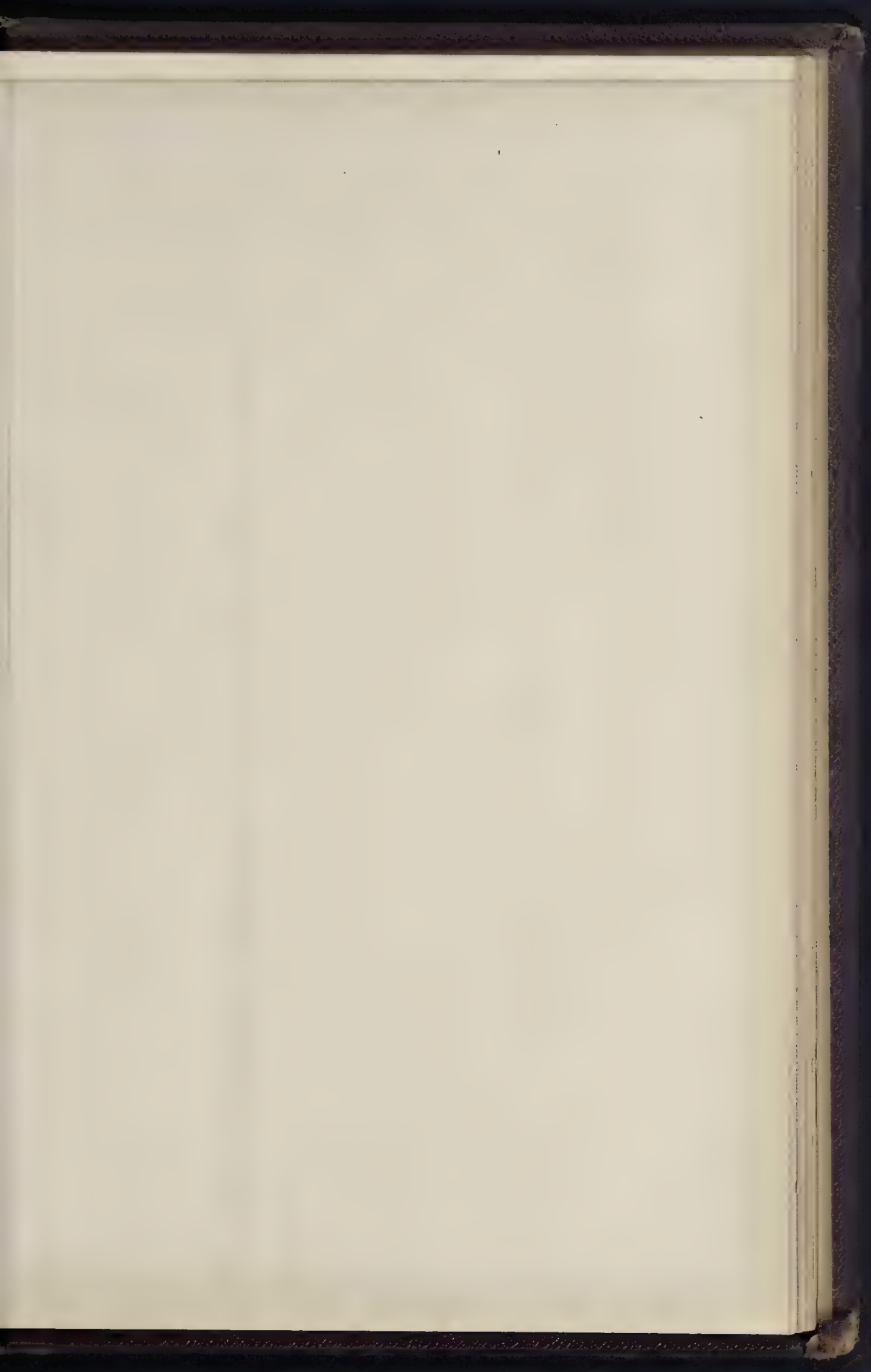
DECORATIVE AND OTHER WORK AT THE ROYAL ACADEMY.

AMONG the decorative designs exhibited at the Royal Academy the first we come to is Professor Aitchison's geometrical section of a "New Picture Gallery at 2, Holland Park-road" (1,418). This is a section of a room with a small dome over the centre, the walls painted a rich but rather broken green, with no wall design; the columns which stand a little way from the angles are of a light-coloured veined marble, with ante of black marble, which also forms the base of the columns

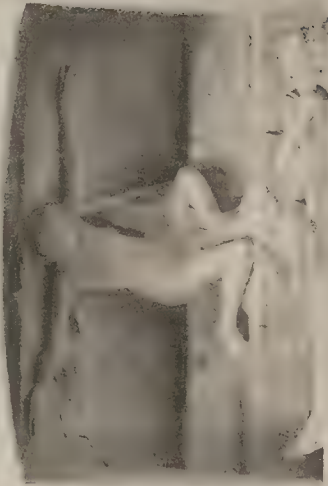
and the walls. The Corinthian capitals of the columns are also of a dark colour, presumably bronze, but it is not very easy to gather this from the drawing. There is a frieze showing dolphins on a blue ground with a conventional wave pattern beneath them, and some ebony (?) chairs of rather Oriental outline and decorated with delicate inlay. The dome surface is left untouched with colour, probably for the sake of light. The effect of the whole is harmonious, and at the same time powerful and well marked in its contrasts of material.

Mr. Champneys' "New Reredos for Manchester Cathedral" (1,419) is not the style of work we sympathise with very much; there is a great deal of thin open-work, highly gilt, about it, producing an effect of glitter rather than richness. Mr. Wilson's "Design for Rood for All Hallows, Southwark" (1,420) is rather too sketchy in execution to make out precisely the treatment intended; there is a crucifix with a wide cross painted blue as a ground, and expanding into square compartments at the end of the three arms of the cross, which are occupied by kneeling angels, whether modelled or only painted, the drawing hardly makes evident. The lower part of the composition is occupied by a row of sainted women, some of them only sketched in, nor can it be determined whether these are painted on a ground, or are modelled figures standing free. The general effect of colour is very good; the heads of the saint figures are rather too small.

Mr. G. F. Bodley exhibits a rather hard pen drawing of the design for the "New Electric Organ for St. Paul's Church, Burton-on-Trent" (1,426). The design is also rather hard and straightlined; the principal decorative effect is obtained by pierced carving in woodwork in repeating patterns and diapers. The pipes are arranged in a semi-circular tower in the centre and smaller ones at the side. This central tower is a favourite treatment with architects, though, as we have before pointed out, it is not the true expression of the interior arrangement of the instrument, in which the larger pipes are at each end and not in the centre, and is moreover not so convenient for the builder. The brackets at the foot, which appear to support the case, are miserably poor and thin. Next to this is Sir Arthur Blomfield's organ-case for St. Saviour's, Southwark (1,429), of which we have given an illustration. Here the main towers are at the sides and the smaller one in the centre. The tops of the pipes in the towers are visible, and not hidden behind the canopies, which only form a heading over them. Either treatment may be defended; but there is more completeness about the design which covers the tops of the pipes, the necessarily unequal length of which is always a difficulty when they are left visible. Pipes of which the tops are left visible are often treated so as to be apparently of equal length on each side of the centre, but this is only a make-believe, in reality half the circumference of one pipe is cut away behind so as to reduce it to the real "speaking length" required by its note. No two pipes of the same stop can ever really be the same length, and it is better to admit this fact and conceal the inequalities of length behind a part of the ornamental casing, than to make believe that the pipes themselves are the same length by leaving a useless piece of metal in front. In other respects this is a fine and effective case; the decoration is rich, and the whole is confined within architectural lines without hardness or squareness; the cornice-like feature which runs across the centre serves to bind the whole together while at the same time it is broken and altered in its lines in going round the "towers" so as to avoid too harsh a straight line. The canopy of the smaller centre tower is treated lozenge-shaped on plan, so as to contrast with the circular plan of the end towers. The latter are supported on brackets of adequate proportions. Mr. Jackson's organ-case shown in his interior of Radley College Chapel (1,434) shows the now not very common feature of what the Germans call a "Positif," or choir organ treated visibly as a small organ in front of the large one, in forming a screen to the player. We hope that this is a real choir organ, and not, as is sometimes the case, a mere arrangement of sham pipes. The "Positif" has its own treatment in three small lozenge-shaped turrets of equal size, the spaces between them prettily filled in with smaller pipes and two angels surrounded by open perforated wood-work. The large organ is treated in three towers of which the centre (semi-circular) is the principal one. There is a good deal of open wood-work, of semi-rococo style, used to give outline and play to the top of the case. We do not quite like the detail of the large leaf-like forms cutting across the flat







MONUMENT A MÉRIS. — VOYAGE AL HILAN. — L'ÉVÉNEMENT D'UNE MÈRE TRISTE DE NE PAS
CROIRE À LA MORT D'UN ENFANT.

ranges of pipes; they seem a little out of scale with the remainder of the design. Mr. Skipworth's organ-case design for Teddington Church (1,444), is the prettiest and most original in detail of all, though, perhaps, a little wanting in solidity of architectural character. A great deal of the filling in panels, in pierced work, in which the vine-leaf is largely used, is charming in treatment. The centre is here almost necessarily emphasised, on account of the high proportions of the arch, under which the case or screen is placed. The pipes have been treated with a little originality, the centre pipe in the small towers having a spiral worked up it, and being slightly gilt, while the centre pipe of the centre tower is also spiralled and elaborately decorated. Mr. Arthur E. Perkins's "design for an organ-case" (1,448) is a good and bold one, very freely treated, and with a good deal of flow of line about it, and shown in a freely-executed washed drawing. This, as well as Mr. Jackson's and Mr. Skipworth's designs, illustrates a common practice now of adding what may be called decorative wings to an organ-case; ornamental projections at each side, which serve to screen off any interval left between the main body of the case and the side of the arch in which it stands, or to break the vertical line of the side. We do not like it so much when an organ stands free on a screen; there seems no sufficient reason for the wing then, which becomes a kind of excrescence; its excuse is to more completely screen the interior of an organ standing under an arch or vault. In Mr. Perkins's design, too, the wings terminate in a feature which looks a little too much like a candlestick lignified (we say "lignified" as people say "petrified").

Keeping for the present to the ecclesiastical designs, we may notice Mr. Tapper's "Bishop's Throne, Colombo Cathedral" (1,451), as a good bit of rich modern Gothic church furniture, shown in a neatly-executed Indian-ink shaded drawing. Messrs. Shrigley & Hunt's "Decoration of Reredos for Newton-le-Willows Church" (1,492) is too high to be well seen, but appears to have a rich decorative effect in the painted figures on richly gilt and diapered grounds. Of Mr. Thomas Grew's "Decoration round Confessionals" (1,542) we may say also that it cannot be very well seen, but produces a pleasing effect by the employment of light-coloured figure subjects (one of them appropriately representing the First Sin) and ornament, on a light red ground; the colouring being altered to a light blue ground above the impost line.

Among the designs for stained glass the most important are the two exhibited by Mr. Holiday, that for the "Apse Windows of Grace Church, Utica" (1,456), of which we have published a monochrome reproduction, and that for the "East Window of the Church of St. Luke's Hospital, New York" (1,470). Both designs, so far as stained glass can be represented in water-colour, exhibit a colour scheme which is rich and effective without being too pronounced or strong in colour. The apse windows, which illustrate the "Benedicite," are treated in three stories of design, the centre one being a series of square panels illustrating such phrases of the hymn as "All ye winds, bless ye the Lord," &c., the elements of nature being represented by assemblies of figures treated in a purely decorative and conventional manner admirably suited to the conditions of stained glass. In this respect the whole treatment of this window might be studied with advantage by the authors of some other designs in the room, who introduce perspective and pictorial effects which are quite foreign to the proper requirements of stained glass. Mr. Holiday's other window represents the figure of Christ in the centre, backed by a semi-circle of white glass, in which the leading figure forms an element in the effect, enclosing a surface of deep crimson. Figures representing the various ills of humanity, on either side, bend or look towards the central figure, and in the side lights are some small scenes illustrating acts of charity towards the sick, which are very suitably treated and grouped. Messrs. Percy Bacon Bros. exhibit the drawing of their "Isaiah Walton Memorial Window" (1,501), which has been illustrated in our pages. Messrs. Percy Bacon have developed a style of quasi-architectural detail in nearly white glass, and partaking both of Classic and Gothic feeling, as a framework and canopy to the coloured figures in their windows, which is effective and suitable for stained glass; and in this window, where the figures are portraits merely, the whole design has a good and harmonious effect; but where, as in their other window, for Newcastle Cathedral (1,474), small

subjects are introduced into this framework, treated in perspective and in a pictorial manner, the result is not to be regarded as satisfactory. Stained glass has nothing to do with pictorial treatment, and has no analogy with it; but there seem to be only two or three designers in this country who have fully realised this. One exhibitor shows us a treatment of (apparently) the miraculous draught of fishes, with a landscape and a lake and distant hills beyond it; a sort of subject which for stained glass is perfectly absurd. Mr. Stephen Adams's "Memorial Window" (1,481), with its conventionally-treated rococo architecture, would be suitable enough for a building in a certain phase of Renaissance style, if the architectural forms were properly conventionalised for the purpose; but the author has only gone half-way in his conventionalism, and shows the forms as if solid and with a shadowed side, which again is absurd in a window design; how can we possibly reconcile the idea of transmitted light with cast shadows? Mr. Gryll's design for the east window of the Radley College Chapel (1,416) looks as if it were good, but is hung too high to be well seen.

We cannot help remarking that it is a most unfortunate thing that a national Academy of Arts can do nothing better for artists in stained glass (those few who merit the name) than give them space to hang a few small water-colour drawings which can really show nothing adequately except the form and arrangement of the design, the effect of colour being merely indicated in flat tints which can convey no idea whatever of the real effect of a stained-glass design. There ought to be a room arranged for the exhibition of stained glass with the light behind it; we could then realise the effect and the treatment, which it is impossible to do any justice to on paper. At the Academy everything is provided for the exhibition of pictures, but nothing for the arts of decorative design.

Of decorative work of a non-ecclesiastical class there is not very much exhibited in the way of original design, but what is exhibited is mostly of good quality. Mr. Formill's "Design for Decoration of a Morning Room in Wood and Majolica" (1,423) is a perspective view of the upper angle of a wainscotted room with a coloured majolica frieze with enormous "swags"; the drawing is bold and powerful, the effect a little too much so. M. Boeckbinder's "Bedroom Ceiling" (1,497) is a piece of work well carried out in its style, but considerably too heavy in effect for a bedroom. It is in the French taste for ceiling decoration, with a circle in the centre painted with a flying figure of Night amid clouds and stars, and the smaller panels are filled with naturalistic groups or bunches of flowers; the architectural details of cornice and panel mouldings are carefully carried out. Mr. R. Hallward exhibits a pretty and fanciful little design under the title "Vespers" (1,526), which looks as if it were intended for the back of a book or something of that kind; it shows two figures of angels put in with dotted lines of greyish tint, dancing on the silhouette of a cloud, with gold stars appearing between their wings. It is a slight little bit of work but it is really original and artistic in feeling. Mr. Hallward also exhibits some good designs for embroidery (1,554). A book-cover for an "édition de luxe" of "Masterpieces of Art, 1894," by Mr. Albert A. Tarbayne (1,539) is a good design in gold on white vellum, in which a conventional treatment of peacocks in front elevation, with their spread tails forming a series of decorative circles, is employed with good effect.

Drawings of old work are not as numerous as usual, but there are some important and valuable ones, the principal among which are Mr. H. C. Corlette's two large geometrical drawings of the colour decoration at St. Anastasia, Verona (1,503 and 1,522). Mr. Alfred H. Hart contributes an excellent and careful drawing of the marble screen and throne in S. Lorenzo, Rome (1,565), and Mr. Francis W. Bedford another of the coloured decoration in the Loggia of the Vatican (1,602). Among drawings of the picturesque class is a frame of admirable little pencil sketches by Mr. Arnold Mitchell, representing "A Week's Sketching in Normandy" (1,523), which were published in our New Year's number of this year; a water-colour drawing of "The Choir Screen, St. David's Cathedral" (1,486), by Mr. T. G. Jackson; an interior, by Mr. A. W. Prentice, of "Dutch Library in a House at Glasgow" (1,499), and a charming water-colour by Mr. Spiers of the "Wolfgang's Kirche, Rothenberg" (1,556), a model of architectural illustration in water-colour, combining effect with accurate representation of detail and texture.

EARLY CHURCH ARCHITECTURE.

At a meeting of the Glasgow Architectural Association, held on Tuesday evening, June 4, Mr. A. N. Paterson, M.A., the President, in the chair, Mr. William J. Anderson, A.R.I.B.A., read the following paper on—

"THE EARLY DEVELOPMENT OF THE CHRISTIAN CHURCH."

The history of the early Church building is a subject which has a varied interest, and is of great importance in several aspects. To the Roman Catholic it is of moment, in so far as it records in stone the history and practice of an undivided Church, the Church of the early fathers—Catholic not only in name, but in substance. The Protestant is attracted to a subject which involves the study of the primitive and persecuted Christian assemblies. If the Protestant in his archaeological study finds that early Church a simpler institution, with customs and ritual less complex than modern Catholicism, Catholics, on the other hand, might contend that the protest of the sixteenth century has been so complete as to give the Churches (Lutheran and Anglican excepted) a character which may be purer and more spiritual, but which, at least, is totally different to the churches of the early period so far as investigation may be carried. To the ecclesiologist it is, perhaps, of paramount importance as the study of the earliest forms in which the Church was worthily realised, and it is his peculiar function to reconstruct its doctrines from its stones. To the architect it is most interesting in its evolution, or gradual adaptation to its purpose, and as the chief link between Classic and Mediæval art, or more precisely, between Roman and that Romanesque which contained the germ of the Gothic principle. The ecclesiologist not only reads all manner of symbolism into its stones, which, in a subjective way, he is quite entitled to do, but often attempts to construct the edifice on a pre-supposed symbolic design, and, despising the aid of true archaeology, derives it from purely spiritual ideas. The architect: is much more cautious in what of this he accepts, and finds its prototype in the forms of surrounding buildings, the customs of the times, and the habits of the race, under the necessity for provision for the new wants of a new faith. The *reductio ad absurdum* of the ecclesiologist is the doctrine of numerical symbolism, by means of which two doors are made to signify the two-fold nature of Christ, and three to signify the Trinity; and confusion of thought is apparent when along with emblems such as the cross and dove, and accounted symbolic in the same sense, the stones joined in the wall of a church are said to symbolise unity. At the same time a certain degree of conscious symbolism must be acknowledged to the builders of comparatively early times; it must be absolutely and frankly admitted in reference to the decoration; and it is therefore the more likely that it ultimately entered into the structure; but we shall be at least on the safer ground if we reject symbolism in the plan and fabric of early buildings, and regard them purely as developments arising out of the practical necessities, under certain given circumstances.

There is no period in the history of architectural development where it can be said that a new building, or class of buildings, was not influenced in some degree by pre-existing structures. The power of originating a complex structure perfectly suited to a new purpose has never been vested in one man, and yet perhaps down to our own day there have been few cases where originality of design was more in demand than in the required adaptation of a building to the wants of the new religion, or the provision of temple form for a faith that had almost nothing in common with the old temple worship. The art of planning or disposing buildings for different purposes had at the time made great progress among the Romans, but, in complexity at least, was not so far advanced as among us to-day, and one building was the pattern of another to a greater extent than with moderns. Under any circumstances, it is natural to look for a model, or models, of the Church in the buildings which surrounded its inception.

In the first place, it will be desirable to have some idea of the relation of the Church to society and public life during the early periods of its existence. For the first three centuries, with but intervals of toleration, the Church was, to all intents, a secret society, persecuted fiercely on at least nine different occasions, and meeting wherever it could possibly escape the rigour of the law. Notwithstanding, by the end of the second century, Christianity had been preached

with success in every department of the great Roman empire, and even beyond the Roman dominions. "An upper room" formed the first meeting place of Christians, and during the apostolic age, and for a long time thereafter, there can be no doubt that anything much better than this was out of the question in most districts. But there were wealthy Christians even in Paul's time, and we know that private meetings were held in their houses, which more or less would conform to the Roman pattern preserved for us in Pompeii. The peristyle of the house was not only the largest compartment, but it was also the most secluded, and although open to the sky in the central part, might even on occasion have been covered. If we can imagine a meeting to take place here, it would be natural for those officiating at communion to take up a position at the tricladium, or dining-saloon, which was sometimes raised, and the little congregation to stand under



CHIEF COMPARTMENTS
OF A ROMAN HOUSE.
A. ATRIUM. B. TABLINUM.
C. PERISTYLE. D. TRICLADIUM OR

Fig. 1.

in a remarkable manner with the disposition of the various classes of hearers in the churches two or three centuries later.

But at times the waste places and catacombs were perhaps the chief meeting-places of the sect everywhere spoken against. The catacombs at Rome were subterranean passages, out of which *pozzolana*, an ingredient in Roman cement, had been for many generations extracted. There the Christians had buried their dead, and, being in the habit of visiting their tombs, had recourse to these hiding-places for secret assembly and communion. At the intersections of the narrow passages chapels were rudely formed, and it may be in this way that the advantages of a transeptal form were made apparent. It was esteemed an honour to be buried in the vicinity of a saint, and probably these catacombs were held in veneration long after the necessity for having recourse to them had ended. Here is the history of the times most succinctly put in what are called the Homilies—"Unto the time of Constantine, by the space of above 300 years after our Saviour Christ, when Christian religion was most pure, and indeed golden, Christians had but low and poor conventicles, and simple oratories, yea caves under the ground, called crypts, where they for fear of persecution assembled secretly together. A figure whereof remaineth in the vaults, which yet are builded under great churches, to put us in remembrance of the old state of the Primitive Church before Constantine; whereas, in Constantine's time and after him were builded great and goodly temples for Christians, called basilice: either for that the Greeks used to call all great and goodly places basilice, or for that the high and everlasting King was served in them."

This brings us naturally to consider the other buildings, with whose form the early Christians must have been familiar, and especially the possible influence of the Roman basilica or law court, from which it has been generally supposed that the Christian basilica was derived. In the above quotation there is no reference made to the Roman basilica, but simply to the root meaning of the word, which was in the Greek a royal residence or king's palace. The Roman basilica most probably took its name from a hall forming part of the arrangements of the palace, where justice was administered. An example of such a private basilica may be traced at Domitian's palace, adjacent to the throne-room, and consisted of an apartment, nearly square, with side

aisles, divided from the nave by columns, and terminated at one end by a semi-circular apse almost equalling the width of the nave. Domitian, however, belongs to the end of the first century A.D., while the first public basilica was erected 184 A.D., according to Livy, and long after the early kings were expelled. The private basilica of the Greek or Roman kings was doubtless the king's judgment-seat, and used for that end exclusively. But the great public basilica of the Romans appears to have served another purpose than that of justice, being used as the place of mercantile exchange. The tribune seems to have been an essential feature of the arrangements, though not invariably in the apsidal form, having in its centre and close to the wall the ivory curule chair of the pretor, flanked by the seats of the advocates; round the sides of the semi-circle were the *subsella*, a raised platform with seats for the accommodation of privileged persons. In front of the chair, and under the arch of the tribune, was placed an altar, where daily libations seem to have been made to the gods, and where the oaths may have been administered. In other respects the forms of the ancient basilice vary materially from one another. Among them, the basilicas of Pompeii, Herculaneum, and Emilia and Julia at Rome, may be mentioned as existing in the apostolic age, while the vast Basilica Ulpia, the work of Apollodorus, belongs to the beginning of the second century. Constantine, the emperor who first recognised the Christian religion, completed the secular basilica of Treves and Maxentius (his predecessor) at Rome. Both of these show a considerable departure in plan and construction from the earlier structures of this class. In the basilica of Maxentius we make acquaintance with the new type, in which the ranges of columns are swept away and the wood roofs replaced by a gigantic cross vault. This type of fabric seems to have been developed in such buildings as the public baths; and the central hall of those of Caracalla, which date about 212 A.D., closely resembles the Maxentian basilica both in plan and construction. The Gothic principle lies latent in this system; but it was this which, carried to Byzantium with Constantine and affected by Eastern methods such as the pendentive dome, produced the style we know as Byzantine. The condition of things regarding these Pagan basilice then seems to be that a large number of the wooden-roofed kind were in use down to Constantine's time, and that the form of basilica then affected was such as is typified by this great work near the Coliseum. It is difficult to credit the theory that the law courts were ever used as churches; certainly, this could not have happened till the time of Constantine, under whose reign the Christians emerged from what has been happily called the "tunnel" period, into the warmth and light of imperial good-will. Even then, the law courts would still be required for business purposes, and the only buildings which became of no use were the temples of the gods.

In considering this subject, the great mistake has very often been made of assuming that there were no Christian churches before the time of Constantine. Many authorities might be quoted as holding that the plan of the law court instantly suggested itself as the most suitable type, and was at once adopted by the Roman Christians of the year 330 A.D., or thereabouts, when the religion became for the first time favoured. There were, however, frequent and long periods of toleration during the first three centuries, and there is every reason to believe that churches were built and other buildings employed and adapted previous to Constantine's time, even in Rome itself. In a paper read before the R.I.B.A. in 1853, Mr. R. Burges says that "the Christians did sometimes obtain by special favour the use of some building of no external appearance, but they were not permitted to extend the dimensions or to affect any imitation of the temples of the gods. Alexander Severus granted a sort of tavern 'for the Christian superstition,' the Taberna Meritoria in the Transiberine district." Of course, all such inferior buildings have long since been swept away, and we are without materials to form any positive judgment on the architecture of this epoch. But it is believed that the Church of St. Maria in Trastevere stands on the site of this old tavern, and we know that St. Pudenziana occupies the site of an old Roman house, said to be that of Pudens, mentioned in the last verse of Paul's Epistle to Timothy from Rome. There is little reason to doubt the statement, and it is highly probable that the house had been employed for Christian assemblies even in Paul's time. On all grounds, I am inclined to believe that in such temporary abodes which the

Church possessed, a long process of adaptation to the forms of service must have been going on, perhaps not so much in Rome as in the provinces, which ultimately took form in the huge basilican churches erected during Constantine's day, some of which have come down to us.

One might be inclined to doubt the existence of a desire on the part of the early Christians to imitate the temples of the gods, as inferred by the quotation just made, and would rather suppose that the temple architecture was as abhorrent to them as idolatry itself; and in the same way we might doubt how far they consciously imitated the form of a place where at times scant justice had been done to them, and which could best be described as a house of merchandise: I mean the basilica. At the same time, it is to be feared they gave little care to such matters. Many of the earliest of these plan forms are almost identical with the cella of Roman temples; sometimes, as if the classic structure had been stripped of its unnecessary encasing columns, or as if the



CHURCH AT DJEMLA
NORTH AFRICA

Fig. 2.

tina (fig. 3), near the Roman forum. The enclosed form of the sacrum or chancel,

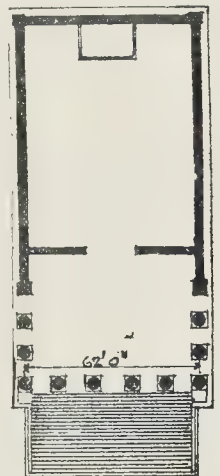


Fig. 3.

however, is not without suggestion of the tricladium of the dwelling-house; and the classical mosaic with which the floor of the peristyle and aisles is laid heighten the resemblance, and give colour to the conjecture.

It seems as if the southern and eastern churches, while possibly more independent in government, had made a more distinct separation between clergy and laity than the early Roman churches, and had endeavoured at a very early period to invest the simple rites of church observance with great mystery and pomp. Hence the exclusiveness of such a sanctuary as that of Djemla and Peloponnesus, where it is cut off from the people by a solid screen wall and formed into a "holy of holies," the harmless survival of which we have in the altar rails and sanctuary of an Anglican church. The key to the diversified types of plan, and perhaps in some measure to the general problem, seems to be the persevering continuance

through everything of varying heathen superstitions and practices. Although the civilised world was one vast Roman empire, and the arts everywhere came under the influence of the capital, yet religion preserved its local colour and form. In the East, Christianity did not fail to partake of the sacrificial character of Semitic worship (the temple was attended by the Palestinian Christians till its destruction), while in the South the mystery and magnificence of Turanian religion characterised the ritual, which was withdrawn from the people. In Rome, however, the Church seems at first to have been truly democratic in accordance with its traditions; gradually, however, adopting the more exclusive tendency, just as at the same period it was gathering to itself the architectural styles of the whole world. You will remember that magnificent passage in Charles Reade's historical novel "The Cloister and the Hearth," where the Friar Colonna rounds on his brother friar Jerome, and tells him his frank opinion that all their Medieval Christian festivals, institutions, and superstitions were purely pagan in their date and method and origin. That the feast of the Immaculate Conception of the Virgin was celebrated on the 2nd of February, the old Romans having been accustomed to hold the Miraculous Conception of Juno on that date; that Janus bore the keys of heaven before St. Peter; that Venus was to the ancient mariners, Stella Maris and Regina Celorum, while Mary to the modern sailor is Queen of Heaven and Star of the Sea; that winking images and the hundred altars in one church are pagan; that infant baptism is Persian and incense Oriental. You remember how Jerome, white with indignation, said that if it was not for Colonna's illustrious family, he would have him burnt at the stake, and the cheerful reply—"And that is pagan. Burning of men's bodies for the opinion of their souls is a purely pagan custom." And when we know that the Medieval church had made its own so great a mass of heathen tradition and corruption, which must have grown up within it, it is impossible to believe that the earlier church, surrounded by an atmosphere of pagan superstition, and what was worse, perhaps, favoured by a corrupt State, could have been quite unaffected and maintained the simplicity with which we often thoughtlessly credit it.

Properly to understand the arrangement of the plan of the early churches, it is necessary to have some idea of the customs of their services. One would not be far wrong in concluding that simplicity of worship characterised the church meetings during the first two centuries. These meetings places required at first no more than an elevated seat for the minister to read or preach from, a table for communion, and a basin of water for baptism, and it was not till far on in the second century that the table became the altar, and was enclosed and railed off, with the seats for the clergy, from the rest of the church. The most noteworthy testimony to the character of the worship of the time is given by Justin Martyr, who suffered in the cause *cir.* 148. He says:—"On Sunday a meeting is held of all who live in the cities and villages, and a section is read from the memoirs of the apostles and the writings of prophets, so long as the time permits. When the reader has finished, the president, in a discourse, gives the admonition and exhortation to imitate these holy things. After this, we all rise and offer prayer. Having ceased from prayers, we salute one another with a kiss; after which, to him who presides over the brethren, bread is brought, and a cup of wine mixed with water. He who presides offer prayers and thanks, and the congregation answer amen. Then they who are called among us deacons, give to each of those present a portion of the bread, and of the wine mixed with water, over which the thanksgiving has been made, and carry away a portion to those who are absent. The wealthy and willing then give contributions, according to their free will, and this collection is deposited with the president, who therewith supplies widows and orphans, poor and needy, prisoners and strangers, and takes care of all who are in want." In the latter part of the second century the Lord's Supper seems to have been separated from the ordinary Sunday service, and only the faithful allowed to remain. Discipline, on the whole, was firmly exercised in the early Church. There appear to have been four orders of catechumens or penitents besides those in full communion, in the post-Constantine Church:—(1) The penitents or mourners, who were only admitted to the atrium, and who stood there in part to beg the prayers of the others to the more sacred parts; (2) the *audientes* or hearers, who occupied the narthex, the part at the entrance screened off by a wall

from the nave; (3) the order of *substrati*, who were admitted within the building, and were so called from the custom of prostrating themselves before the bishop or priest when the sermon was ended, to receive his benedictions and prayers specially offered for them, after which they were dismissed with the *audientes*, having no right to join the communion service. This custom, in some degree, survives in the ordinary forenoon service in most Congregational churches, and also in the "fencing of the tables" at the few-and-far-between Presbyterian communion services. (4) The fourth order were the *consistentes*, who remained to the whole service and joined in the prayers, but not in the sacrament itself. They also occupied, probably, the nave of the church, while the *fiddlers*, or faithful, occupied the side aisles (just as in the fancy picture I drew of the hearers in a Roman peristyle), the men generally in the south aisle and the women in the north.

A brief description of the normal form of basilica



EARLY CHRISTIAN CHURCH.

Fig. 4.

position. Beginning, then, at the eastern end, the entrance is made usually through a projecting open porch to the atrium, a quadrangular court surrounded by a covered alley, a survival of which, down to the present period, is to be found in the cloisters of monastic establishments, which in appearance it resembled. This is a feature which does not exist in connexion with Roman basilicas, although it has been seriously suggested that in the forum we find its prototype. This, however, is, on the face of it, far-fetched, and only propounded to bolster up the basilica theory at one of its weak points. The atrium, at least, was almost certainly obtained from the dwelling-house, and like the dwelling-house the church seems to have had its public atrium from one side only, while the basilica entered from all available sides. On the west side of the atrium, on the side next the church, the cloister passage was often wider, and formed the narthex, the next division of the church. Before entering the narthex the worshippers were accustomed to wash their hands in a fountain which occupied the centre of the enclosure, and this is doubtless the simple origin of the holy water in the Mediaeval churches, although the custom of sprinkling with water was one common to the pagans, and the *aspersorium* a feature of their temple furniture. Doorways gave access from the narthex into the church proper, the central door being generally larger and more richly ornamented, and ultimately called the royal gate. The plan of the nave is a square or parallelogram, having either single or double aisles on each side. These aisles are wide, one story in height, and lighted by a row of small windows of marble panes high up in the walls. The columns dividing the aisles—generally abstracted from ancient temples and other buildings, with little regard to regularity—bear a continuous entablature or support arches, and the roofs appear to be of open timber-work of a rude character. Occupying the western part of the nave proper, and often extending halfway into the church, is the raised platform of the chancel or choir, having a low wall around it, with a gate at the church and lateral entrances

close to the bema. On this screen are placed the ambo, one for the reading of the Gospel and possibly for preaching, while another opposite is provided for the reading of the Epistles. The position of the choir is not a little remarkable, though natural on musical grounds. Although modified to Mediaeval times, and departed from in modern days in the Anglican Church, no deviation, perhaps, is more to be regretted musically, and architecturally, at least in so far as it is the function of architecture to fit a building to its uses. The beauty of the arrangement is, however, better understood when it is remembered that the full members of the early Church occupied the aisles, and the back part of the nave was reserved for the *consistentes* and *substrati*. Within the arch which terminates the nave, a few steps lead up to the fourth division of the basilica, the bema or sacrum, which to some extent corresponds with the Mediaeval chancel, or perhaps more properly, to the "presbytery" part of it within the altar rails. Under the floor, and just within the arch, called by symbolists the arch of triumph, and supposed to represent "triumph over death and the grave," is frequently found the confessional, which contained the relics of a martyr or saint. Right over it was the communion table or altar, elevated and enclosed by a baldachino supported on columns, and hung between the curtains. For the most part, both in Anglican and Roman Catholic churches, this position has been long departed from, the table being placed so that the celebrant stands with his back to the people. But in the earlier and more beautiful arrangement the pastor's or bishop's seat was placed in the middle of the apsidal tribune (or *concha*, from a shell), from which he must have risen to administer the sacrament. On each side of him were ranged the seats of the deacons or presbyters. The bema is flanked on the right by a room or apartment called the *prothesis*, the place where the bread and wine were kept, and on the left by the *diaconicum*, the sacristy or robing-room of the deacons, and, perhaps, used for other purposes. These apartments in the Eastern church almost invariably formed the termination of the side aisles. In the sectional construction and external appearance, as well as the decoration, there is even less to connect the church and the civil basilica. The five-aisled basilica of Trajan had at least the semblance of a vault internally, and the external effect of its two-storied side aisles must have been very different indeed from the low side walls of the church. These doubled-storied aisles, with their internal galleries, give no suggestion of the deep decorative frieze over the arches or entablature, which forms one of the most striking and characteristic features of the church interior, decorated as it was, first with frescoes and at a later date by mosaic pictures of the truths of the Christian religion.

The paper was illustrated, and the views of the lecturer supported by reference to diagram plans of Roman houses and temples, and of churches in North Africa, Greece, and Syria. A large number of lantern-slides were then exhibited, including plans and sections of the Roman forum, with the two basilicae of Julia and Maxentius, and a restoration of the former, the restored Pompeian house and its features, the interior of old St. Peter's, St. Clemente, St. Lorenzo, and St. Apollinare in Classe, near Ravenna, Torcello, Parenzo (fig. 5), and the early church of Canterbury. The exterior of Palladio's basilica, or town hall, at Vicenza, was shown as possibly the nearest thing existing to the civic basilica of the Romans, which he certainly intended it should resemble; than which nothing could well be more unlike the external effect of the early churches preserved to us. It was briefly described how the tomb of the Romans, and the circular chambers of the baths, became the baptistery and the circular or



Fig. 5.

octagon churches, a class by themselves. The chief difference between the church of St. Vitale at Ravenna, and the building generally known as the temple of Minerva Medica, is the same as exists between the church and Roman temple of the normal form—namely, the complete enclosure of the temple by an outer wall. In conclusion, Mr. Anderson said that he had attempted to prove that the civil basilica was not the model of the church building, which is to be sought in other directions. He did not insist that the Roman house afforded the only solution of the problem, but offered the suggestion that it may have had at least as much influence as any other building. It was an easy method to attribute any new development in architecture to one cause, but very many had to be taken into account in any really scientific solution, and perhaps the whole subject depended on investigations yet to be made in remote parts of the Roman Empire, where the church may have existed before the time of Constantine. A short criticism followed, opened by Mr. W. T. Connor, A.R.I.B.A., and in which Mr. A. McRibben, A.R.I.B.A., and Professor Gourlay took part. The customary vote of thanks was awarded to Mr. Anderson by the chairman.

ROYAL SOCIETY CONVERSAZIONE.

THE second conversazione this year was held at the apartments of the Society, Burlington House, in the evening of Wednesday last, the 12th inst., and was, as usual, a brilliant success. Some of the exhibits had been held over from the first soirée, but there were many new ones of special interest to us, though the exhibition, as a whole, was not so good as it generally is.

Japanese art was well *en évidence*; Mr. W. Gowland, who has for many years resided in Japan, showed a number of large pictures illustrating the different schools of painting in that country, but the main object of the exhibit was to mark the effects of time on the pigments used by the old Japanese painters. Amongst the various subjects represented were a full-length portrait of Kwanyin, the Goddess of Mercy, by Jo Kisbo and To Ryo, who lived in the earlier part of the fourteenth century; this was dated A.D. 1322, and was taken from the altar of a Buddhist temple. Another, of the fifteenth century, represented Li Tich Kwai a Chinese immortal, by Cho Densu; a third, a Buddhist saint; whilst others depicted birds, fish, and trees. The exhibitor laid special stress on the nature of the pigments used, illustrating his remarks by referring to the old painting of 1322. He showed that the permanent blue was *lapis lazuli*, which the Chinese painters ground into very fine powder, sorted by levigation, and mixed with water and a small quantity of glue. The red was chiefly oxide of iron, but the vermilion was obtained from a mineral found in the country, sulphide of mercury. The greens were carbonates of copper (malachite), but time has made them nearly black—the change being effected possibly by the action of the glue mixed with the pigment. Black tints were obtained from soot prepared from the oil of *Sesamum indicum*. Permanent white was made in those older times in Japan by exposing oyster-shells to the weather, so that their organic matter might as far as possible be removed, and when sufficiently rotted they were pounded up, levigated, and mixed as before; we noted that nearly all this “permanent” white was now yellow, whilst in certain places it had gone quite brown. The gold used does not seem to have altered much. Mr. Gowland expressed the opinion that had the picture alluded to not been subjected to the deleterious fumes of incense, being hung over the altar, the colours would have been still better preserved.

A series of nine photographs, with map, ground plan, and section, of a Roman Mithraeum, or Mithraic Temple, discovered on the east bank of the Medway, at Wouldham, near Maidstone, was exhibited by the curator of the Maidstone museum. This temple, or “cave,” had apparently been built into a sandbank; it is orientated, and measures 40 ft. by 20 ft. Numerous fragments of tiles, Samian and other pottery, together with a coin of Constantinople, were found during the excavations. This is stated to be the only building of the kind hitherto found south of the Tyne. The Butte Docks Company had models illustrating Messrs. Lewis & Hunter's patent coal shipping system, as in use at Roath Dock, Cardiff, one of the advantages of which is, that the coal can be discharged into the hold of the vessel without being broken or much dust formed. The carrying

boxes, slung by cranes, have a cone-valve or bottom, which is released to let the load out when it is lowered to within 18 in. of the flooring on which the coal is to be delivered.

As a matter of general interest, it may be noted that Professor Norman Lockyer exhibited photographs relating to his recent discoveries in spectrum analysis, which bid fair to revolutionise our knowledge concerning the constitution of certain stars. Although many of the lines shown in the spectra of these stars have been well understood for years, several others have hitherto proved enigmas, and it is to the elucidation of these latter that Mr. Lockyer has specially applied himself within the past few months—stimulated by the recent confirmation of his theoretical discovery of helium many years ago in the spectrum of the sun. In his further researches he employs an apparatus for collecting the gases obtained from minerals by the distillation method, a photograph of which was exhibited. After treating a number (about thirty) of different and uncommon minerals in this apparatus, one at a time, and taking their spectra, it was ascertained that several of them gave out lines identical with the spectral elements in the stars alluded to, thus demonstrating that in all probability the minerals indicated exist in an incandescent condition in the heated envelopes of those stars. These important researches all tend to prove what is being made clearer and clearer every day, viz., that there is a great deal in common in the chemical constitution of various members of the Universe, though from the diverse physical conditions of those members, some being hotter than others, and variable in other respects, the problem is considerably involved.

Dr. J. Joly exhibited photographs in what was termed natural colours. The process of taking and reproducing these differs in no way from ordinary photography upon the dry plate, except that the sensitive plate is in the camera exposed behind a screen lined in particular colours. The positive is subsequently viewed through a screen lined with three other colours—the three “fundamental colours” which upon the three-colour theory of vision are supposed to give rise to all our colour sensations. The specimens shown, first attempts, were very rough, having the appearance of being grained; this, the exhibitor explained, could be obviated by his using better appliances—it is a wonder he did not get these latter before showing the results to the Royal Society. It is also a matter for surprise that those who are making “colour photographs” will persist in explaining that they are “natural” colours; judging from this exhibit they are vulgar, florid, and very unnatural.

Electrical exhibits were far less numerous than usual and there were hardly any worthy of note. Sir David Salomons had a moderate-sized magnet, with a loop filament lamp placed between the poles, showing the action of a D'Arsonval galvanometer; whilst experiments were made to illustrate the rhythmic vibrations shown by the filament when traversed by an intermittent direct current when placed in the magnetic field. Lord Armstrong showed an apparatus demonstrating the effects of an outward positive and an inward negative current of electricity manifested by the travel of a cotton thread in the centre of a column of water flowing outwardly in the contrary direction; also photographs of electric discharge in air.

Mr. H. Thomson Lyon showed an instrument known as the parabolograph, for describing parabolas by means of a combined sliding and link motion; Sir David Salomons also had a model of a four-legged adjustable levelling-table, which, on having an object placed underneath one of the legs so that it stood unevenly, adjusted itself on pressure being exerted on the table-top. This was accomplished by two of the legs being drilled out so that false ones, which were compensatory in their effects, could slide up and down inside them, thus preserving stability. Bacteria from the Thames of various kinds, experiments in connexion with the transmission of infection by flies, silvered mirrors for reflecting telescopes and eolithic implements were amongst the numerous other things on view.

COMPETITIONS.

NEW SETTLEMENT BUILDINGS, UNIVERSITY HALL.—The competition designs for the new settlement buildings for University Hall, Gordon-square, W.C., will be on public view at Dr. William's Library, Gordon-square, on Tuesday, the 18th inst., from 10 a.m. to 1 p.m., on Wednesday from 10 a.m. to 10 p.m., and on Thursday from 8 p.m. to 10 p.m. The competing

architects are:—Messrs. C. C. Brewer and A. Dunbar Smith, M. S. Hack, Gerald Horsley, A. H. Mackmurdo, E. W. Mountford, Ernest Newton, E. S. Prior, Halsey Ricardo, W. Stirling, F. W. Troup, F. Waller, and H. Wilson. The assessor (honorary) is Mr. R. Norman Shaw, R.A.

THE FOX ALMSHOUSES, NORTON, STOCKTON-ON-TEES.—Some fifty architects submitted competitive plans for these almshouses. The trustees have selected the design marked “Northton,” Messrs. Clark & Moscrop, architects, Darlington. Their scheme provides separate houses for twelve men, porter's lodge, common room, and clerk's offices. The grounds are laid out in old-fashioned formal style, with straight paths, bowling-green, sundial, &c. The elevation will be a group of gabled, half-timbered, and brick houses, covered with red tiles.

WINTER GARDENS NEW BALL-ROOM, BLACK POOL.—On Monday the directors of the Blackpool Winter Gardens met to consider the five sets of plans sent in for the proposed new ball-room, and other additions. It was eventually decided to adopt the designs of Messrs. Mangnall & Littlewood, of Manchester. The cost of the extensions will be about 50,000/.

Illustrations.

“MONUMENT AUX MORTS”: SCULPTURE.

WE are glad to be able to present our readers with an illustration of M. Bartholomé's fine and striking work in sculpture, exhibited this year at the Champ de Mars Salon, and which has commanded the admiration, we may say, of all who have seen it.

The whole work typifies Humanity progressing towards the House of Death—some of the figures with joy, some with resolution, some with terror and despair. It is a striking point that, of the two figures with their backs to the spectator, who are entering the tomb, the woman seems, as far as attitude and action can imply, to be encouraging and supporting the man. The groups on each side are not, as they have been absurdly misrepresented in the press, the mourning relatives of the two in the centre; they are other types of humanity on their way in turn to the dark entry.* Below are seen the forms of husband, wife, and infant lying in the tomb, the angel of Hope watching over them. On the background is inscribed in French the text—

“They that sat in darkness and the shadow of death, upon them hath the light shined.”

The Municipal Council of Paris have commissioned the sculptor to carry out this impressive work in stone, in the cemetery of Père Lachaise. It is fortunate for M. Bartholomé that he is a Frenchman. Had an Englishman produced such a work, he might have waited long enough before either a State or a municipal authority would have troubled their heads about it.

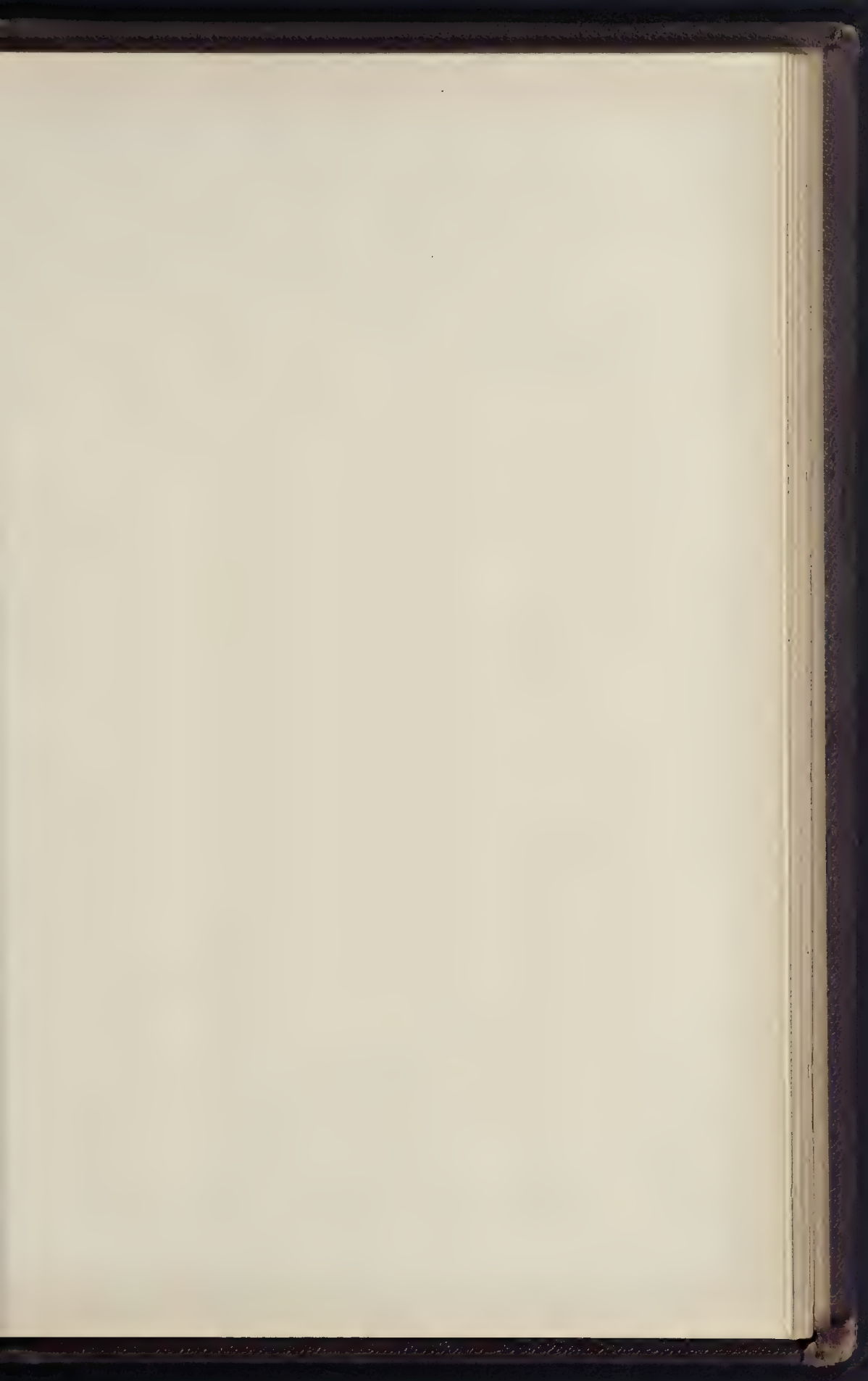
NEW CHURCH, PETWORTH.

THE new Catholic church at Petworth, together with the priest's house in connexion, is now in course of erection. The materials used externally are local Sussex stone, with Bath stone for the windows and dressings, the roofs being covered with Westmoreland green slates. The internal masonry is in Beer stone throughout. The plan of the church is cruciform, with a total internal length of 101 ft., and a width of 39 ft., the transepts having a width of 60 ft. 6 in. The chancel is groined in stone, the rest of the roofs having panelled ceilings. Mr. Fredk. A. Walters is the architect, the contractors being Messrs. Goddard & Sons, of Farnham and Dorking. The total cost of the church and house will be about 9,500/.

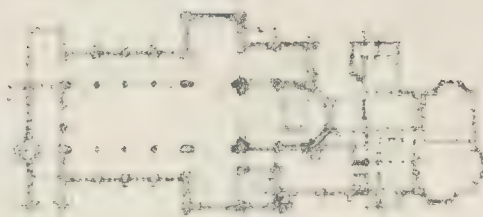
STUDIO, CHÂTEAU DE BUILLON.

This is a studio for Mr. James Tissot, the well-known French painter, at his country estate near Besançon, in the south-east of France. It is partially an old building, said to have formed part of an ancient abbey. The lower portion of the walls and the tower are of the local stone of the estate, the upper story mainly of half timber-work and plaster, and the roof is covered with tiles. Inside, the studio or painting-room has an open timber-roof, with a gallery along one side and end. Opening from this room on one side is a salon, and on the other and one end are

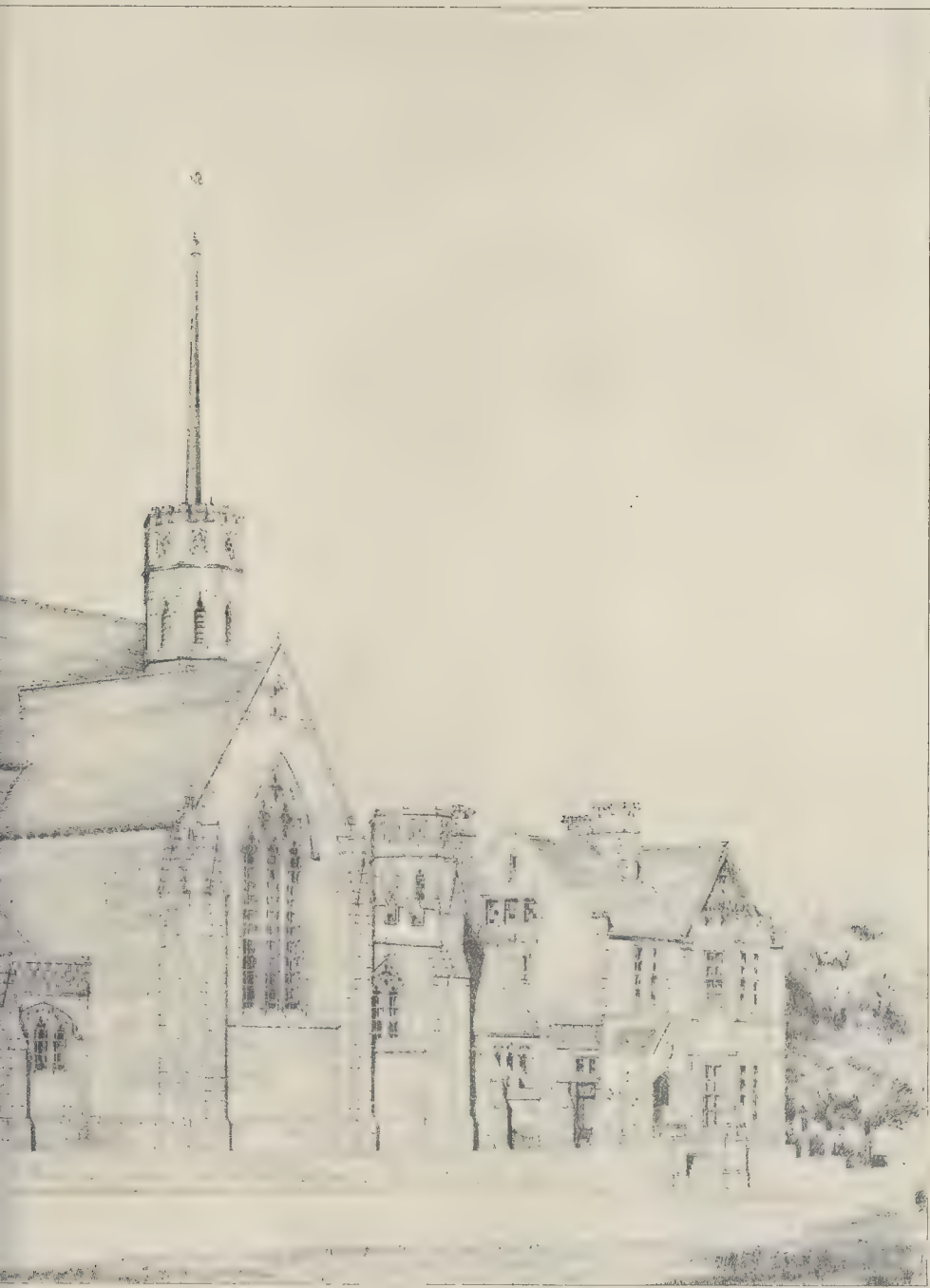
* We have the sculptor's own authority for this explanation; which, in fact, ought to be quite obvious from the design itself.

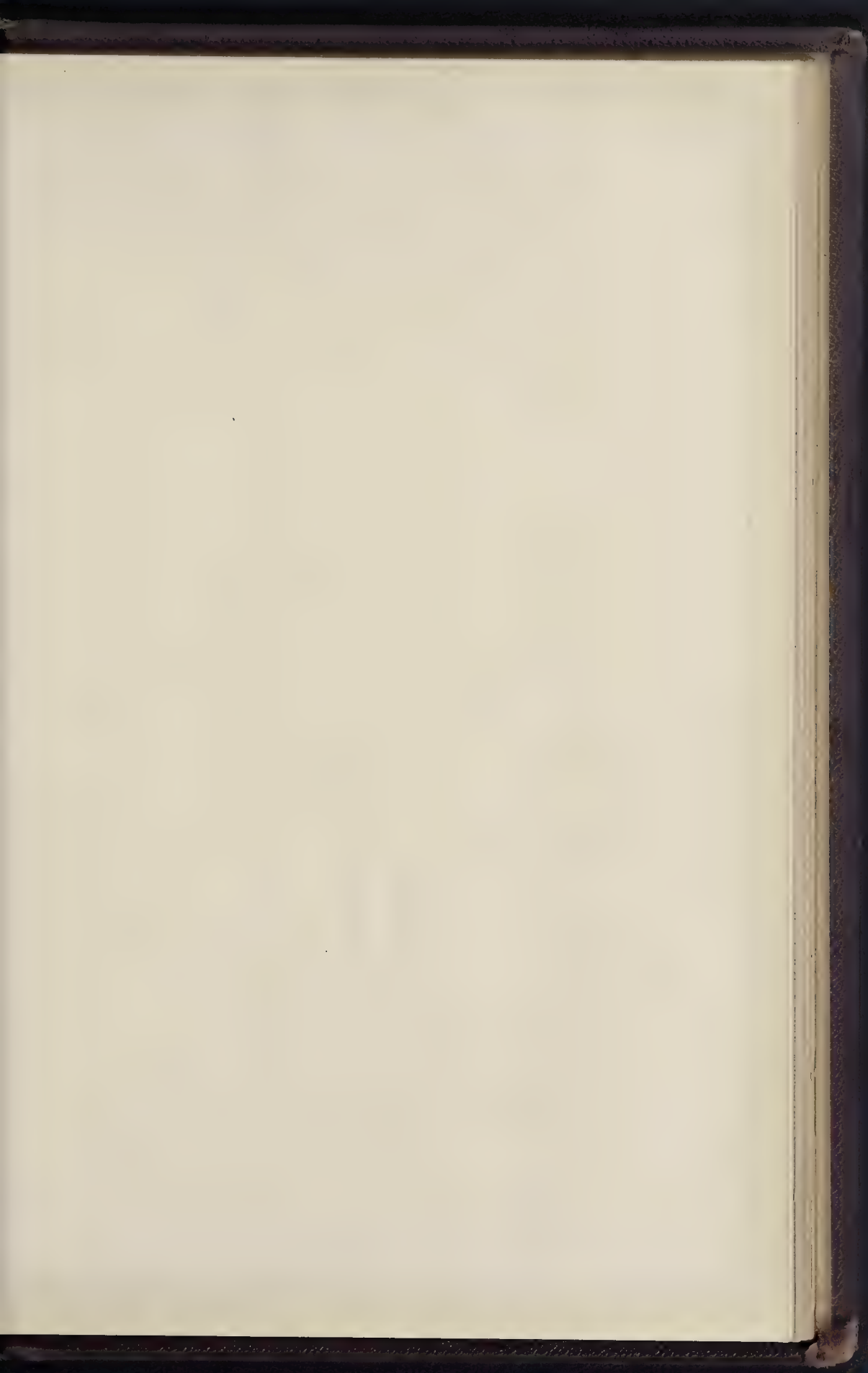


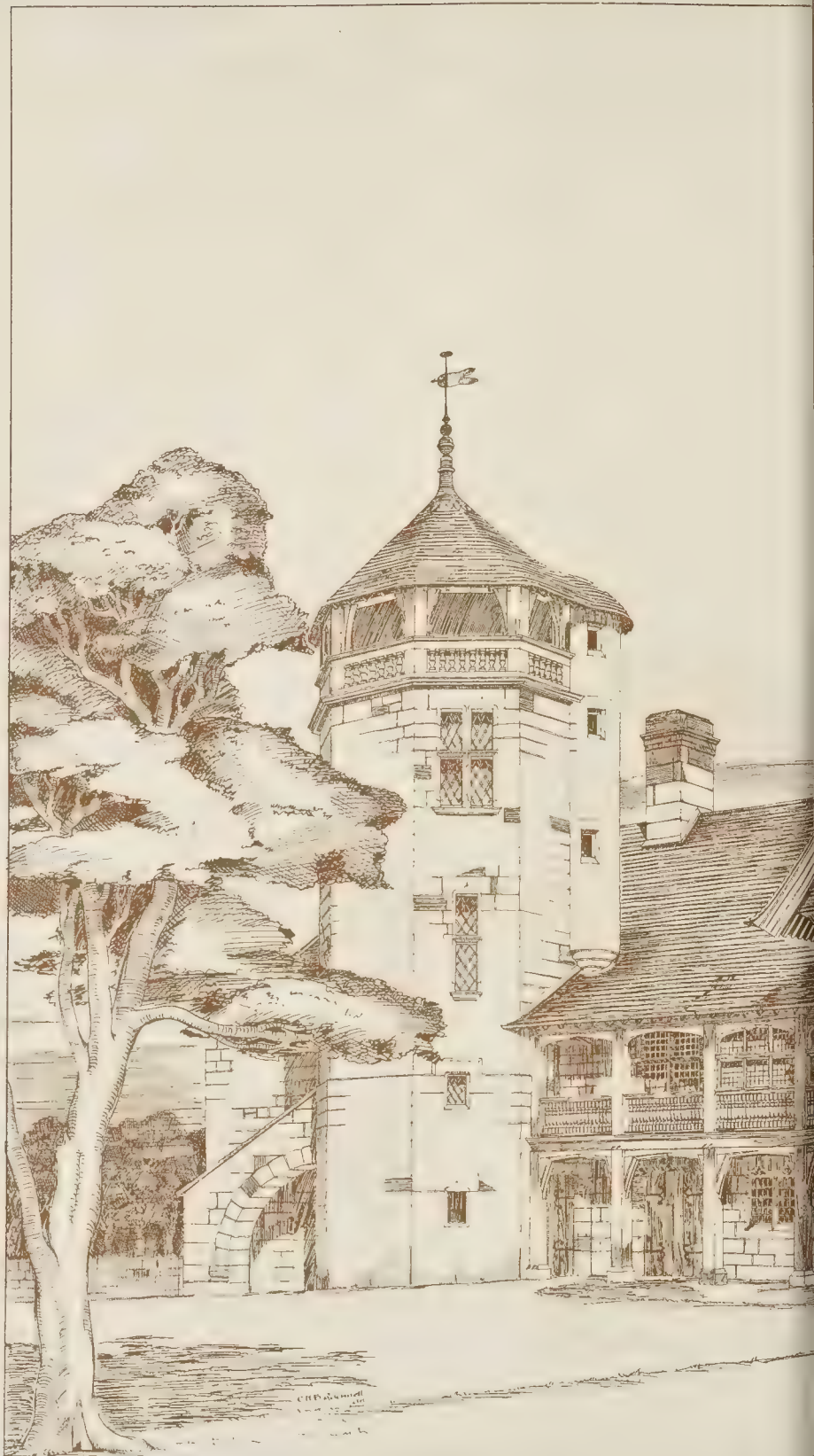
General Block Plan

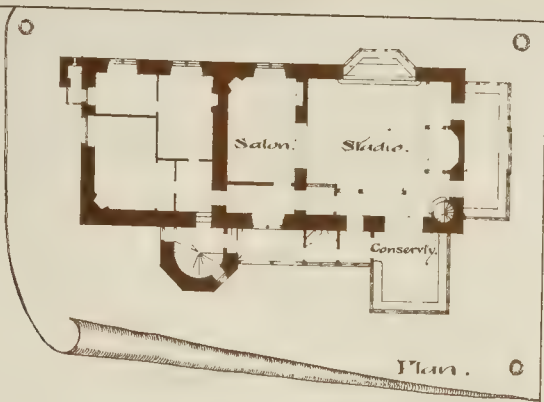


NEW CHURCH, PETWORTH, SU









conservatories, seen in the view as projecting over the arcade and the columns.

The studio forms part of extensive alterations and additions going on at the chateau from Mr. Brydon's design, with M. Vielle, of Besançon, as resident architect on the spot.

The drawing is exhibited at the Royal Academy.

HOME ARTS AND INDUSTRIES ASSOCIATION.

The eleventh annual exhibition of the "Home Arts and Industries Association" is being held during this week at the Royal Albert Hall, and shows some very creditable work.

The objects of the Association, as some of our readers are aware, are to teach the working classes the minor arts, i.e., woodcarving, inlaying, metal repoussé, basket-making, and leather work, by means of voluntary instruction given at the homes of the teachers, or in rooms provided for the purpose. Over 500 classes are at work in England, Ireland, Scotland, and Wales, and these are supplied with designs, models, and leaflets of elementary instruction.

Of the exhibits as a whole one cannot speak too warmly; they are, it is true, often the work of mere lads and girls, but they show strongly the interest which is taken in their execution, and do not possess the hard machine-like look which similar articles invariably bear on view in any ordinary shop.

Of the work generally we can scarcely single out examples, but mention might be made of the medicine cupboard in walnut and inlaid with various coloured woods, by a member of the Pimlico School, and designed by the Hon. Mabel de Grey, and also the well-executed convertible hall settle and table from Clonkeen, Co. Limerick. The fisher-boys of Southwold show some excellent and useful articles in wood, executed in the winter evenings. In wood-carving the schools at Sandbach and Altrincham are foremost, but the work bears the impress of almost professional hands, and does not appeal to us so well as the simpler home-made articles. The Princess of Wales's Technical School at Sandringham shows some creditable work in wood-carving, and the needlework from the hand of Her Royal Highness shows her skill in this direction.

Throughout the exhibition some excellent examples are shown of beaten copper in such articles as candlesticks, trays, &c., recalling old work in their simplicity of treatment. Some of the best of these are from Mrs. Waterhouse's class at Tatenden Court. Stamped leather for book-covers and the like are sent from all parts, and show improvement in design on the ordinary trade articles. Other articles, such as hammered iron screens, pottery of various kinds, wooden water-jugs, &c., all executed with special fitness to their purpose, make up a very interesting exhibition, and are to be sold at prices comparing favourably with the ordinary stock articles.

Mr. G. F. Watts, R.A., has manifested much interest in the Association, and it is principally by his munificence that the endowment fund has been started.

As an attempt to revive the old handicrafts which once flourished in England, but which have now in many cases died out, and to encourage the labouring classes to take a pride in making their homes beautiful by their own work, the Association is pursuing a good and useful end.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE fifteenth general meeting (business) of the session of this Institute was held on the 10th inst., at 9, Conduit-street, Regent-street, Mr. F. C. Penrose, F.R.S., President, in the chair.

The President referred to the British School of Archaeology at Athens, and read the draft of a memorial proposed to be sent to Lord Rosebery, urging the claims of the school to an annual grant from the Government. Whereupon it was resolved "That the Council, on behalf of the Institute, do memorialise the Prime Minister in the terms of the paper read to the meeting."

The President read a letter from the Secretary of the Burlington Fine Arts Club containing an invitation to students to visit the Exhibition of the Art of Ancient Egypt now being held in the rooms of the Club.

A motion by Mr. Octavius Hansard, That it be recommended to the Council to publish the names of the seven proposers of any name or names added by Fellows and Associates to the nomination list issued by the Council, seconded by Mr. Gruning, was discussed and agreed to.

The President then read the report of the

scrutineers appointed by the annual general meeting to conduct the election of the Council. The following were declared to be elected:—

President.—Francis Cranmer Penrose—unopposed.

Vice-Presidents (4).—Aston Webb, 461; James Brooks, 418; Ernest George, 408; Alex. Graham, 385.

Hon. Secretary.—William Emerson—unopposed.

Members of Council (18).—John McKean Brydon, 399; George Aitchison, 397; Richard Phene Spiers, 392; Edward William Mountford, 384; Arthur Cates, 376; John Alfred Gotch, 376; John Slater, 374; Thomas Blashill, 367; John Belcher, 366; Campbell Douglas, 364; Edwin Thomas Hall, 360; Thomas William Cutler, 350; Paul Waterhouse, 349; Arthur Edmund Street, 344; Benjamin Ingelow, 340; Edward Augustus Cuning, 334; Henry Louis Florence, 331; Charles Hadfield, 315.

Associate Members of Council (2).—Thomas Miller Rickman, 236; Beresford Pite, 216.

Representatives of Allied Societies (9).—Alfred Culshaw (Liverpool Architectural Society); Edward John Dogshun (Leeds and Yorkshire Architectural Society); Thomas Drew (Royal Institute of the Architects of Ireland); John Goodacre (Leicester and Leicestershire Society of Architects); William Henman (Birmingham Architectural Association); John Holden (Manchester Society of Architects); James Jerman (Devon and Exeter Society); Joseph Oswald (Northern Architectural Association); Thomas Lennox Watson (Glasgow Institute of Architects) [unopposed].

Representative of the Architectural Association.—William Douglas Caroe—unopposed.

[The above members, who were declared to have been duly elected, compose the Council.]

Auditors.—Fellow, Frederick Todd; Associate, William Woodward—unopposed.

The President also read the report of the scrutineers appointed by the annual general meeting to conduct the election of the four Standing Committees.

A vote of thanks to the scrutineers was moved from the Chair, and carried by acclamation.

The following candidates for membership were then elected by show of hands:—

As Fellows.—Charles Busted Fowler (Cardiff), Francis Thomas Dollman [A.]. As Associates.—Herbert Phillips Fletcher, George Hubbard, John James Joass, Geoffrey Prater Armstrong, Walter Robert Jaggard. As Hon. Corr. Members.—Alexander Wielemans (Vienna), Ferdinand Feltner (Vienna).

The meeting then terminated.

—Abridged from the *Journal* of the Institute.

ARCHITECTURAL SOCIETIES.

GLASGOW INSTITUTE OF ARCHITECTS.—A quarterly general meeting of this Institute was held on the 30th ult., in the chambers of Messrs. MacLean, Fyfe, & MacLean, 115, St. Vincent-street, the President, Mr. T. L. Watson, in the chair. After other business had been transacted, the following gentlemen, having been recommended by the Council and being approved of by the meeting, were duly elected members of the Institute, viz.:—Messrs. William H. Howie, Miles S. Gibson, Robert Miller, Andrew Balfour, Peter M'Gregor Chalmers, Alexander N. Paterson, Henry B. W. Steel, Alexander M'Gibbon. Messrs. W. F. Salmon and John James Burnet were re-elected Governors of the Glasgow School of Art for three years from August 1 next.

DEVON AND EXETER ARCHITECTURAL SOCIETY.—The annual meeting of the Devon and Exeter Architectural Society was held at Exeter on the 6th inst. Mr. James Jerman presided. The President said the annual report did not record a long list of papers read or of visits to places of interest, as circumstances had diverted the attention of the Society in other directions. In the near future they hoped to return to these matters, and also to promote classes for systematic study for the benefit of the students. Their work for the past year had rather been one of development. A matter of importance was the establishment of a central place for the Society's work, for the reception of books and collections and for meetings. If only an ordinary amount of interest was shown, much might be done in this direction. It might be possible before long to appoint a representative committee for the whole district to confer as to the best methods for utilising the valuable educational advantages afforded in the technical colleges and classes which were already doing good work. The report having been adopted, Mr. Arnold Thorne was

elected President for the ensuing year, and Mr. Crocker Vice-President. Messrs. Warren, Commin, and Cole were elected on the Council, and Mr. Tait was re-elected Hon. Treasurer. The resignation of Mr. Warren as Hon. Secretary was accepted with regret, and the selection of a successor was left to the Council. Mr. Ballan was re-appointed Assistant-Secretary and Librarian. The Chairman presented Mr. Hine with a photograph of the members in recognition of his services in connexion with the visit of the Society to Plymouth; and the proceedings closed with a vote of thanks to Mr. Jerman for presiding. The members took luncheon together at the New London Hotel, and afterwards inspected various places of architectural interest in the city.

ARCHÆOLOGICAL SOCIETIES.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—The concluding meeting of the session of this Association was held on the 5th inst., Mr. C. H. Compton in the chair. Mr. W. de Gray Birch read a list of the places to be visited during the forthcoming Congress at Stoke-on-Trent in August. Mrs. Dent, of Sudeley Castle, sent for exhibition some further illustrations of tiles from Winchcombe Abbey, one of which bears the curious canting device of Tydemann de Winchcomb, Bishop of Worcester, 1395—1401, viz., a capstan or winch, and a large comb surmounted by a mitre and pastoral staff. A paper was read by Mr. Walter Money on Shirburn Castle, Berks., and some notes on four Northamptonshire churches of the Norman period, from the designs of a French architect, were contributed by Mr. J. T. Irvine. The churches are St. Peter's, Northampton, Castor, near Peterborough, Maxey, and Wakerley. Upon one of the capitals in Wakerley Church there is some curious carving illustrative of a knight on his way to the Holy Land, parting from his lady, who had accompanied him as far as the Hellespont; she is taking leave of him beneath the walls of the city of Constantinople, and in the background the carving indicates a very early representation of the church of St. Sophia, the dome and the openings for light being distinctly shown; the date is about 1120. Mr. R. B. Barrett then read a paper upon Caistor Castle and Sir John Fastolf, which was illustrated by some pen and ink drawings. In this paper he pointed out the incorrect orientation given to the map in Mr. Dawson Turner's book upon Caistor published in 1842. In this map, or plan, the author placed the chapel of the castle, a free chapel dedicated to St. Margaret, and chapel of the adjacent college, at a point adjoining the Great Tower, and the compass-points would appear to have been made to agree with that position, but Mr. Barrett showed from observations of the shadows cast at noon one day in May, 1893, and from reference to the Cambridge orientation chart, and the Ordnance maps, that the orientation of Mr. Turner's map could not be accepted as correct.

Correspondence.

To the Editor of THE BUILDER.

THE HYGIENIC EXHIBITION AT PARIS.

STR,—With reference to your paragraph in "Notes," on page 429 of this week's *Builder* about the coming Sanitary Exhibition of Paris (under the patronage of the Municipality of that city), you are probably not aware of the fact that, although English firms are asked to exhibit, they are entirely excluded from supplying their goods to the Municipality.

Our own experience of the treatment shown to foreigners by the City of Paris is not very favourable.

Some ten years ago we established works in Paris for the manufacture of our various sanitary appliances. On our applying for permission to tender for the supply of our goods to the Municipality, we were informed that we must give proof that all our staff was French, and that all the material employed in our manufactures was of French origin. This we did to the entire satisfaction of an "expert" appointed by the "Conseil Municipal," and who examined our books, vouchers, &c. In spite of this gentleman's report, and even against the request of M. Rechin, Chief Engineer of the "Ponts et Chaussées," to use our goods, the "Conseil Municipal" decided that our manufactures should be excluded from any works connected with them.

Such treatment is, we think, quite sufficient to explain the absence of English exhibitors from the exhibition in question. DOULTON & CO.

ATTENDANCE AT ROYAL INSTITUTE OF BRITISH ARCHITECTS PAPERS.

SIR,—As one of the younger Associates standing under your rebuke for non-attendance at Professor Brown's paper on Anglo-Saxon, may I be allowed a word in reply.

I imagine that the Professor is too well acquainted with the ways of students to have expected a larger attendance on their part for a paper which is pre-eminently one to be read.

Why should they have attended at all, seeing that illustrations were not to be expected, and that they would not venture to take part in the discussion, since only experts are very properly expected to speak at the R.I.B.A., although, as you have often complained, the older men do not, at times, keep to the rule. Personally, I had noticed with pleasure that the Professor was giving a paper, because I had studied with great interest his former effort, a brilliant rebanding of such a well-treated subject as Vitruvius.

I hardly expected, however, to derive much benefit from an hour's listening to a learned enquiry into Anglo-Saxon remains; a paper to be read with some care and thought. Non-attendance does not lessen the value of the paper.

The whole question of these papers requires reconsideration. The recent notice inviting MSS. was distinctly amusing. One may wonder when the Royal Institute of British Architects will do as the Engineers, and give prizes for such work, when it would be worth while to prepare such papers.

Students have enough artistic voluntary study to go through without adding the preparation of papers to the burden. A paper worth attention involves not only some originality and much study, but also days of actual writing, and is then regarded very often as a mere piece of advertisement.

If the preparation of papers is of any value in architecture, as the late G. E. Street thought it was, the whole subject requires to be raised to a different level.

ASSOCIATE.
* In our opinion there is almost always something to be got from personal attendance at a paper and discussion, which escapes in the reading of it without attending. And as long as the reading of papers is an accepted means of bringing ideas before the profession ("or art") to which a man belongs, it is a kind of duty to encourage the reader by personal attendance. Nothing is duller and more disheartening than reading a paper, perhaps the result of much thought, to empty benches.—ED.

The Student's Column.

BRICKS AND TERRA-COTTA.—XXIV.

LOCAL DEVELOPMENT OF BRICK-EARTHS.

London District.

IT is not necessary for us to go much into detail concerning the development of earths suitable for brick-making in the London district, but it may be noted that the various loams in the river valleys and the London Clay are the sources chiefly drawn upon. The drift deposits vary in composition from sandy clay to clay very poor in arenaceous matter. They require to be mixed with chalk before being suitable for the purpose, especially in the neighbourhood of Ilford, Erith, and Croydon. The sections also are variable in thickness. Many of the older brickyards near Ilford are closed, but it is yet a brickmaking centre. The stratification of the clays there is generally regular and horizontal, though the layers frequently thin out, or expand, as the case may be, when traced very far. The beds of sand are irregular and undulating, whilst in some places the sands and clays pass into each other. "Race," or nodules of carbonate of lime, are common in the brick-earth. Mr. Whitaker gives the following section of the beds in the brickyard at Ilford, north of the railway:—

Ilford Brick-earth.

1. Brown clay and brown loam, together 8 ft., with "race" and a few pieces of flint.
2. Brown bedded loam of a lighter colour, more sandy and with thin partings of sand, as much as 9 ft. in places. Close by, this is half made up of layers of sand, some false bedded.
3. Light-coloured sand below.

So active is brickmaking in the vicinity of Erith and Croydon that it is barely possible to recognise surface features after the lapse of six or seven years, the whole of the superficial drift to the extent of many feet having been removed from the face of the country. Within the past year or so enormous sections, quite 30 ft. to 40 ft. in depth, have been cut out. The character of the earth does not differ essentially from that at Ilford. An examination of a dozen samples collected in various spots shows considerable variation in regard to the relative amount of clay and sand, and grains of glauconite are more frequently met with than at Ilford.

Apart from the general excellence of the earth between Erith and Dartford, the proximity of chalk affords great facilities to the manufacture.

At Grays, in Essex, enormous excavations, both in the chalk (for lime) and brick-earth, may be seen. The latter is burnt in open kilns when derived from the drift; but great care is exercised in the manufacture of bricks from the argillaceous Thanet Sand, above the chalk, in the higher parts of the section. The earth is carefully prepared, moulded by machinery, and burnt in well-built closed kilns. The brick produced is superior to many made in the London area, being hard and sound. A microscopical examination of several varieties of this Thanet Sand, showed that (ignoring the drift above) the material became more and more argillaceous from the surface down to its junction with the chalk, at which point it is an almost pure clay with the mineral allophane well developed. The hard grains constituting the sandy portion were for the most part quartz, but a number of flint specks were also seen, especially in the sand of the lower part of the section. Glauconite and zircon were rare as compared with other sands examined. There can be but very little doubt that elements are present in the lower Tertiary beds of this area for enabling a much better brick than has hitherto been made to be produced, although, as before remarked, the brick now turned out is far above the average.

In the neighbourhood of Acton large quantities of bricks have been manufactured from a drift deposit resembling the London clay, and also from the latter formation itself. The brick-earth has also been worked at Ealing Common, and many other places.

Until within the past few years the London Clay, the loam beneath it, and the Thanet Sand were worked for bricks, &c., at Loam Pit Hill, Lewisham, and judging from the size of the excavations, the industry must have been a large one. The loam is composed of thin partings of clay and sand alternating with each other. A similar deposit has been drawn upon for many years at Bromley.

The mottled plastic clay of the Reading series is of great value in the outlying parts of our district, especially near Ewell and Epsom. This is worked for the manufacture of fire-bricks, tiles, drain-pipes, and coarse pottery. Mr. H. H. French, who has made detailed investigations as to the strata near those places, has published the following particulars.* At Nonesuch Kiln, one of the most important yards near London, the following section was measured:—

Brickyard Section at Ewell.

	ft. in.
Clayey soil, with flints	4 0
Fine white loamy sand	5 0
Red clay, with grey mottling, false bedded, getting lighter in colour as it rises, top part more sandy	8 0
Green, red, and purple clay, with pockets of red and white sand, and a few pebbles, passing down into sand	5 0
Layer of pebbles	0 2
Coarse, bright green, glauconitic sand, with more or less horizontal tubular borings, filled with very fine white sand, capped with red clay	0 6
Coarse glauconitic ferruginous sand, with a tendency to false bedding	0 6
Laminated clay, mottled greenish and reddish, with glauconite sandy partings	0 9
Highly ferruginous streaky sand	0 4
Highly glauconitic sand, with partings of fine drab in the uppermost 9 in., and of red clay below	1 3
Layer of black pebbles	
Greyish, strongly glauconitic sand, with scattered flint pebbles, and pebbles of drab clay, some "race"	1 7
Finely laminated brownish loamy clay	2 0
Tough blue clay, passing into bed below	2 0
Sand	0 0

We give the above section in detail as illustrating the wide variation in character of the deposits in one brickyard; similar beds occur at many places in the Reading series from Croydon to Reading, and also along the outcrop of that series in the northern and western portions of the London basin. It would be impossible to enumerate the different yards situated in that outcrop, but we may select a few for description in the Reading area presently. What we desire to call special attention to is that, given such a great choice of materials as is found at Ewell, it is possible for the intelligent manufacturer to make almost any of the different clay-goods not demanding absolutely pure clay. Dug at proper seasons of the year, nearly all the important beds can be

kept separate from each other, and then mixed in such proportions as the particular class of goods in hand requires. With such a material as the Reading "mottled clay" a great deal of shipping takes place in wet weather, the beds being thus commingled, when they do admirably, after treatment, for brickmaking.

A sample of such mottled clay from Park Hill, Croydon, yielded the following chemical analysis to Dr. Hodgkinson:—

Silica	47.70
Oxide of iron	15.76
Oxide of manganese	.12
Alumina, in the form of aluminic silicate	23.36
Moisture, lost on drying at 100° C.	86.04
Water of hydration	6.36
	7.39
	100.69

Reading District.

The neighbourhood of Reading has long been noted for the manufacture of bricks. The earth of which they are made is derived from the basement bed of the London Clay as well as the Reading series. One of the best-known pits, which may serve as a type of the others, is the Katesgrove Kiln, opened more than 100 years since. The section continually changes as the material is worked into, like that in the adjoining Waterloo pit. The following particulars are abridged from an account by Mr. Whitaker, of the Geological Survey:—

Brickyard Section—Reading.

	Feet.
Clay, sand, and gravel.	
Soft loam, lower part ironshot, and sometimes with ochreous concretions, &c. (used for soft bricks)	11
Dark red clay, partly mottled	4
Light ash-coloured clay with fine sand (used for bricks)	7
Fine sand, laminated and partly mixed with clay (used for tiles)	4
"White vein," fine ash-coloured sand, with a little clay (used for bricks)	5
Dark red clay, mottled with blue (used for tiles)	6
Lowest brick-clay, light grey, with fine sand	5
White sand (used for bricks)	4
Fulter's earth	3
Yellowish quartzose sand	4
Brown clay and sand	4
Chalk	

The above section was made many years ago, and it may be that the uses to which some of the beds are put are slightly modified owing to changes in lithological character with the progress of the working. It is merely quoted, as before mentioned, to give some idea of the nature of the earths used in the locality, and the manner in which they occur. Other well-known Reading brickyards are Mock Beggars', at Earley, where the basement-bed of the London Clay rests on the mottled crimson and grey plastic clays of the Reading series; Norcot kiln, where pebble gravel overlies the lower part of the London Clay, consisting of brown loamy sand, containing thin layers of grey clay, reposing on plastic clays, underlain by well-stratified and false-bedded buff and whitish sands of the Reading series; and Grovelands, where is a fine section of the same beds, but with whitish sands of considerable thickness.

Neglecting the brick-earths near Hungerford, let us pass by the numerous exposures along the north-western outcrop of the Lower Tertiary beds of the London basin, in the vicinity of Watford, Hatfield, &c., into the country around Ipswich, Hadleigh, and Felixstow.

Ipswich District.

The clays of the Reading series and the London Clay are worked for tiles and draining-pipes, and the latter formation forms a good brick-earth in its more sandy state, as near Hadleigh and at Ipswich, where the lower beds are worked.† The drift brick-earths, as a rule, are of little importance; but they are worked at and near Boxford, to the east of Ipswich, and at Trimley. Boulder clay is used for brickmaking after removing the stones by washing the material.

Colchester District.

The London Clay in this area has been dug for the manufacture of bricks at Seven Stars Green, near Fordham, and is used in combination with loam from the drift. In a brickyard to the north-east of Colchester it is bedded, and has calcareous bands. Pits are also situated at East Donnyland, Brightlingsea, Alresford, and St. Osyth. The

* W. Whitaker. "The Geology of London." Vol. I. (1889), p. 228.

† "Proc. Geol. Assoc.," Vol. viii. (1882), p. 230.
† "Mem. Geol. Surv.," relating to the area, 1835, p. 101.

dressings, and there are open timber roofs covered with slate. The inside fittings are of pitch-pine, and the passages are paved with tiles. The tower is of low proportions, with parapets, and there is a square timber spire covered with oak shingles. The church accommodates 174 adults. The work has been done in sections, as the funds were raised. 1st, the chancel and vestry were erected in 1888, and opened to the old nave; 2ndly, the old nave was demolished and the new one erected in 1893-4; and 3rdly, the tower and spire were built in 1894-5. The stone font was the gift of Miss Arkwright. The architects were Messrs. Christian & Purday, of London, and the builder was Mr. Wm. Wade, of St. Neots. The bell-loft in the tower is capable of accommodating a peal of six or eight bells. A turret-stair leads to the belfry. The castellated parapet is ornamented. At the four corners there are figures emblematical of the four evangelists, Matthew, Mark, Luke, and John, and between them appear representations of the heads of the Right Hon. William Ewart Gladstone, the Rev. Henry Elwell, and a parishioner. There is also a relief of the head of Mary Magdalen, and others of a nondescript nature.

CONSTITUTIONAL CLUB BUILDINGS, PONTPOOL.—On the 6th inst. a new Constitutional Club was opened at Pontypool. The building has been completed at a cost of nearly 2,000*l.*, from the designs of Mr. D. J. Lougher, architect, Pontypool, by Messrs. Monks & Co., contractors, of Newport. The walling in the front elevation is of native blue stone, with buff brick and Bath stone dressings. The other walls are constructed of native sandstone, and relieved with red brick, quoins, reveals, jambs, and arches. The internal accommodation comprises:—On the first floor, reading-room, with committee-room behind, smoking-room, and lift-room, with lavatory accommodation. On the ground or street floor, billiard-room, bar, hall and staircase, vestibule, and lavatory accommodation. Owing to the peculiar nature of the site, the caretaker's department is provided under the street floor. The reading-room is arranged to accommodate from 120 to 130 people. It is divided off from the committee-room behind by means of large folding doors, which, when further accommodation is required, can be thrown open, converting both into one large room. A balcony is provided outside the reading-room, to which access is obtained from the latter by French casements. It is constructed with slate floor, ornamental iron railing around, and supported by iron brackets.

WESLEYAN CHAPEL, BOLTON, YORKSHIRE.—A new Wesleyan chapel will shortly be erected in Bolton. The new building will be of stone from the local quarries, and the style will be Gothic. The interior of the building, including the class-room, which will form a transept when required, will seat 159 worshippers, and the whole will be heated with hot air, the apparatus to be supplied by the Sheffield Heating Company, Sheffield. Mr. T. Stokes, of Thirsk, is the architect.

WESLEYAN CHAPEL, GARTON, YORKSHIRE.—At Garton, near Driffield, a new Wesleyan chapel has just been opened. The building is from plans by Mr. Jos. Shepherdson, architect, Driffield, and will accommodate from 200 to 300 people. The approximate cost will be about 800*l.*

SANITARY AND ENGINEERING NEWS.

NEW LIGHTHOUSE ON THE ADMIRALTY PIER, DOVER.—On the 8th inst. Mr. Layton Lowndes, as Deputy-Chairman of the Dover Harbour Board, laid the first stone of the new lighthouse which is being erected on the east side of the Admiralty Pier, the object of the new building being to obtain an improved light and higher level than at present. Mr. A. T. Walmisley is the engineer.

SEA WALL, PENZANCE.—On the 1st inst. Major-General H. D. Crozier, R.E., Local Government Board Inspector, held an inquiry at Penzance as to the application of the Corporation to borrow 10,000*l.* for the building of a new sea wall on the western side of the Promenade, to replace the wall washed down during the gales of last winter. Mr. G. H. Small, Borough Surveyor, said the proposed new wall would be 737 ft. long, and would provide for a level walk 8 ft. below the surface of the Promenade. This walk would be approached by six steps from each end, and a double flight of steps in the centre of the length of the wall. The total height from the foundation to the level of the promenade varied somewhat, but at the eastern end it was 29 ft., in the centre 27 ft., and at the western end 23 ft. They proposed to place the foundation 4 ft. in the clay. A slipway would be constructed at the western end 8 ft. wide. The face of the wall would be of granite ashlar, the bed set in Portland cement mortar, and the joints pointed and grouted. The backing would be of Portland cement concrete in the proportion of six to one—4 of granite macadam, 2 of sand, and 1 of cement. The top portion of the face of the wall would be a straight batter, the coping stones of granite, toothed into the course below at intervals of 14 ft.

SOUTHALL-NORWOOD DRAINAGE.—The District Council of Southall-Norwood applied some time ago to the Local Government Board for sanction of a loan, amounting to 4,976*l.*, to carry out works of sewerage and sewage disposal, surface-water drain-

age, and street improvements, but the Central Board has refused to sanction any further scheme of sewage disposal which does not, at the same time, provide land for the filtration of the whole of the effluent before it passes into the river Brent. The Local Government Board point out that, under the present arrangement, the sewage from the London County Asylum at Hanwell, which is in the Norwood parish, is not to be passed through land after being chemically treated at the outfall works; and that, in failing to do so, the District Council had not conformed to the conditions on which a previous loan was granted. Very large drainage works have recently been erected at Southall, and the District Council took the opinion of an expert as to whether the sewage and refuse liquid from these works, if passed into the sewer, would interfere with the work of chemical clarification at the outfall works. The opinion was that the sewage might be allowed to pass into the sewer without harmful results. But the Local Government Board has made to the Local Council a firm declaration to the contrary, and so matters are at rest for the present. Recently, a large area of building was transferred from Weston to Norwood, and is now, it is stated, waiting development; but will not be touched until the drainage extensions are carried out.

MUNICIPAL HYDRAULIC WORKS, GLASGOW.—The works which have been conducted by the Corporation of Glasgow to supply hydraulic power throughout the city were inaugurated on the 30th ult. The work was begun two years ago, and it has now been completed at a total cost of about 260,000*l.* Situated on rising ground at the junction of High-street and Rottenrow, on the former site of some of the worst hovels in the city, the works consist of a series of castellated red-stone buildings. In anticipation of a great development in the use of hydraulic power, the works have been made to accommodate twice the amount of plant at present necessary. Any street or any part of the circuit can be easily cut off from the main system should accident or other causes render such a step necessary. The plant at the pumping station includes a tank made of specially tested cast-iron, three-quarters of an inch thick, which is capable of storing 20,000 gallons of water. The station was designed by Messrs. Ellington & Woodall, London.

FOREIGN AND COLONIAL.

FRANCE.—Four statues in stone, symbolising the "Four Seasons," have been placed in the "Cour d'Honneur" of the "Hôtel des Archives Nationales" in Paris. The monument to Bousingault, the eminent chemist, is just being terminated at the Conservatoire des Arts et Métiers. M. Dalou has modelled the bust, which will be cast in bronze and placed on a red marble column on the top of a flight of steps. At the Ecole des Beaux-Arts M. Baudot and M. Perret have obtained First Medals in the architectural competition for first-year men. A bronze bust of Viollet-le-Duc, by Hiolle, has been presented to the Trocadéro Museum. The great works commenced some time ago for the carriage of the Paris sewage to Achères are now nearly completed, and will be formally inaugurated by the municipal authorities at the end of this month. The complete carrying out of the scheme for the sanitation of Paris will include drainage works extending as far as Herblay, with a pumping station at Méry-sur-Oise. For the eastern and south-eastern portions of Paris a system of land distribution is to be employed at Maisons-Alfort and Choisy-le-Roi. There is talk of transporting to the Louvre a very fine marble equestrian statue of Henri IV., by Jacques, now at Fontainebleau, and which formerly decorated the room called the "Salle de la Belle Cheminée." The inhabitants of Fontainebleau complain very much of this continual robbing of the Château of its best ornaments. M. Valleton, architect to the Department of the Gironde, has been made a Chevalier of the Legion of Honour.

The monument to President Carnot, at Nice, will be inaugurated on either the 24th or 29th of the present month. The monument will stand in the Place Cassini, and consist of a bronze bust on a stone pedestal, and surrounded by a decorative grille. It is proposed to build a cathedral at Oran (Algeria), on the Place de l'Évêché. The Chamber of Deputies has under consideration a Bill for authorising the scheme for bringing additional water to Paris from the valleys of the Loing and the Lunain. The Minister of Public Instruction has appointed a special committee to consider the reconstruction of the theatre of Orange, which is to become a kind of French Bayreuth for the annual representation of classic drama. The death is announced, at the age of forty-eight, of M. Louis Charles Fauconnier, former pupil in the Pacard-André atelier, and author of the monument at St. Germain in commemoration of the war of 1870. M. Fauconnier was a member of the Société Centrale des Architectes.

MISCELLANEOUS.

NEW CITY STREET.—Upon the application of Mr. Delissa Joseph, F.R.I.B.A., the London County Council have given their consent to the formation of a new thoroughfare leading out of Crutched Friars to be called Rangoon-street. The street, which is

the first street sanctioned in the City of London by the London County Council under the new London Building Act of 1894, cuts through the half-acre of land, formerly occupied by the East and West India Dock Company's warehouses, and recently sold by them.

THE CITY COMMISSION OF SEWERS.—Several hours were spent in a discussion of the policy of carrying out street improvements and repairs in crowded parts of the City of London continuously by night as well as by day, at the meeting of the Commission of Sewers, held at the Guildhall on Tuesday last. The discussion arose out of a report from the Streets Committee recommending the repaving with asphalt, by the French Asphalte Company, of Fenchurch-street and Laverpool-street, and, by the Val de Travers Company, of Mansion House-street and the Poultry, the same principle being again discussed in a subsequent paragraph of the report, recommending that the carriage-way of Upper Thames-street be relaid with Australian hardwood by the Improved Wood Pavement Company. The various proposals having been discussed seriatim, four separate divisions were taken, the result in each case being the defeat of the advocates of continuous working; but these advocates, unwilling to accept the decision as final, gave notice, after several of the divisions, that they would move to rescind the resolutions at the next meeting. Another paragraph of the same report led to a lively discussion. This related to the lighting by electricity of the minor streets of the city, the report recommending that experiments should be made with three different systems of electric lighting, the City of London Electric Lighting Company carrying out the work at cost price, estimated at about 386*l.* An amendment by Mr. Wallace was accepted proposing that an experiment in incandescent gas-lighting should be carried out simultaneously, and that the debate be adjourned in order to give the members an opportunity of studying the bearings of the matter, which he regarded as of the highest importance from several points of view. It was decided to print and circulate, in the meantime, a special report on the subject, made by the Electrical Engineer of the General Post Office, Mr. Freese.

PROPOSED REFUSE DESTROYER FOR TORQUAY.—Colonel C. H. Luard, R.E., has just held an inquiry at Torquay concerning the application of the Corporation to borrow 3,800*l.* for the purchase of land for pleasure-grounds, street improvements, and a site for a refuse destructor, to be erected on land abutting on Upton-lane and Park-field-road. The Town Clerk said that for many years the town's refuse had been deposited on Windmill Hill, St. Marychurch, but now that site was required for other purposes, and St. Marychurch District Council had required the Town Council to cease placing its refuse there as early as possible. Complaints had been made as to the nuisance arising, especially as there was a large accumulation. There was some opposition by residents in the neighbourhood, but he did not think they understood that a refuse destructor, properly worked, caused no nuisance. It was one of the things a health resort like Torquay should have. Mr. H. A. Garrett, Borough Surveyor, produced the plans of the grounds. The site proposed for the destructor was removed from thickly-populated districts, but was centrally situated, and was the most suitable, because it would save a considerable amount in cartage. He did not think any property in the neighbourhood would be injured by a destructor. Most of the destructors he had visited were near houses, and at Bournemouth houses had been built close up to the destructor. Alderman Harrison said the smoke emitted by the Bath destructor was a mere nothing. It was no nuisance to anyone living within 20 yards. Rev. G. H. Statham, representing the Schools Union, said a new school was to be erected near the site of the proposed destructor, and he asked the Council to give careful consideration to that fact. Mr. Butland said the new school would be much nearer a slaughter-house than the destructor. Mr. Statham: No. The inspector, at the close of the inquiry, visited the proposed site.

THE PROPOSED REBUILDING OF NORTH BRIDGE-STREET, EDINBURGH.—In accordance with a remit of the Lord Provost's Committee of Edinburgh Town Council, the City Superintendent of Works has, says the *Scotsman*, prepared ground plans (1) showing an arrangement with a view to the entire reconstruction of the buildings on both sides of North Bridge-street from the south end of the new bridge up to High-street, with a frontage near the upper end of Cockburn-street, where partly rebuilt; and (2) showing only the two northmost tenements rebuilt and the rest of the street southwards left as at present. In the former of the plans the increase of the width of the street to 75 ft., uniform with that of the new North Bridge—according to the accompanying report of Mr. Morham—renders it necessary to acquire the property on each side nearly to the full extent, within the limits of deviation provided in the Parliamentary plan, from Fleshmarket Close on the west to Carubber's Close on the east, including the Bridgeside Works building in Jeffrey-street. Mill-square, near the south end, on the west side of the street, is at present 32 ft. wide, and if this width be retained, there would only be 14 ft. left for the depth of the new buildings at this part. This,

[illegible]

THOMAS GARNON.—Responsible for the building of the
Garnon Rectory. Messrs. Barry & McConnell, architects, Wallall,
Wiltshire £3,330

THIRSK.—For the erection of three warehouses, &c. Messrs.
Hawes & Poley, architects, North Street, Beverley. Quantities
by architect £663
By Greenlaw
C. K. Mansfield, Sewerby, Thirsk (accepted) 645
[Architect's estimate, £695.]

THIRSK (York).—Accepted for the erection of Wesleyan
church, Bolton. Mr. Thomas Stokes, architect, Thirsk. Quantities
by the architect £399 10 6
Masonry—J. C. Comforth, Coxwold.
Joinery—H. Nicholson, Old Byland, Helmsley
Slatting—W. Dodgson, Thirsk
Plumbing—J. W. Jackson, Thirsk
Painting—J. Rutherford, Thirsk
Heating Apparatus—Sheffield Warming Co.,
Sheffield

TODMORDEN.—Accepted for the erection of school buildings,
Wadsworth, for the U. D. School Board. Mr. J. Horsfall, architect,
Tadmorden. Quantities by the architect £1,095 10 6
Masonry and Bricklaying—Emanuel Riley,
Hebden Bridge
Carpentry and Joinery—Greenwood & Black,
burn, Hebden Bridge
Slatting and Plastering—J. Wiggles & Sons,
Hebden Bridge
Plumbing and Glazing—S. Taylor, Hebden
Bridge
Slatting and Engineering—J. Butterworth,
Rochdale
Painting—J. Horsfall, Hebden Bridge

TUCKFIELD (Sussex).—For the construction of underground
reservoir, &c., for the Water Company. Mr. John Lewis, C.E.,
New Shoreham, Sussex. Quantities by engineer £173 4s. 3d.
Reckham Bros., Church-street, Uckfield

WILLOUGHBY (Notts).—For the erection of schoolmaster's
house, and alterations to school, for the School Board. Mr. G. H.
Barrowclough, architect, Mill street, Loughborough £750 5
A. G. Bell 840 0 W. Bailey 755 0
Wain & Lovett 840 0 A. & S. Mills 755 0
F. Barker & Son 840 0 A. A. Foulds, Lough 740 0
W. F. Harding 810 0
W. Moss & Son 810 0
Accepted subject to sanction of the Education Department.

WOOPERTON (Northumberland).—Accepted for alterations to
farm buildings. Mr. G. Reavell, jun., architect £37 4 6
W. Allan Wooller

YATE (Near Bristol).—For repairs to the Chippingdonbury
Union, Yate. Mr. W. Holbrow, surveyor, 6, St. Stephen's-avenue,
Bristol £150 18 6
J. J. Mills (accepted) 150 18 6
R. W. Ridler 150 0 Ollis 140 0 0
Hawkins & Son 150 0 0

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Advertisements for the current week's issue are received up to
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should be in by TWELVE noon on WEDNESDAY.

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ADVERTISEMENTS OR ORDERS TO
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JUNE 23, 1895.

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Masons' Details, Institution of Civil Engineers' Premises.—Mr. Charles Barry, F.R.I.B.A., Architect	Single-Page Photo-Litho
Entrance Hall, Moorgate Court, E.C.—Mr. H. Huntly-Gordon, A.R.I.B.A., Architect	Single-Page Photo-Litho
North Sea and Baltic Canal	Single-Page Ink-Photo
The Bridge at Levensau	Single-Page Ink-Photo
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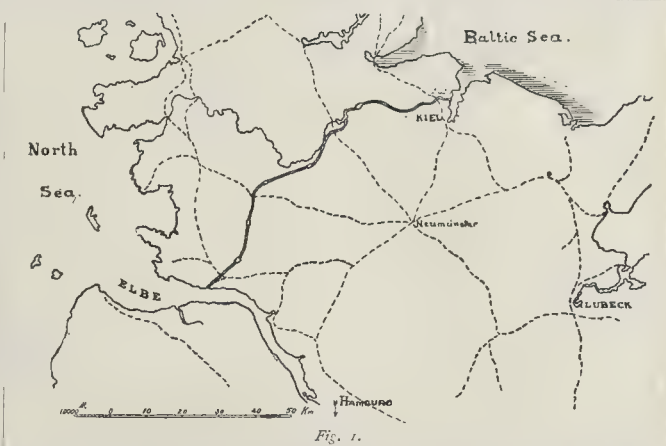
The North Sea and Baltic Canal.



THE New North Sea-Baltic Canal, though a most important piece of engineering, can perhaps hardly be reckoned among the more remarkable examples of

fin de siècle construction. The Canal, which is, of course, of great naval importance to Germany, and also has a certain commercial value, no doubt required the careful attention of those responsible for its construction, but no extraordinary talent has been brought into play. There is little of special interest on the route for the civil engineer, excepting in certain details, and general excellence of the workmanship. The architect will, of course, expect still less in a work of this kind, but he will be agreeably surprised to find that the general appearance of the work has not been forgotten, and that the few opportunities given for architectural design have been fairly made use of. From an architect's point of view, therefore, the new waterway compares very favourably with the Suez Canal, or the Manchester Canal, where little or nothing has been done for appearance. The few bridges are an ornament to the new works, the granite masonry of the locks and embankments shows an admirable finish, with a few simple mouldings wherever an opportunity has been given; and there is, we are glad to say, no sign of the hideous stock cast-iron railing and lamp-post generally found on works of this class. The buildings erected for offices, lighthouses, or for the employes have also all been carefully designed, and, though of no architectural pretension, are much better than those usually found elsewhere. In one instance the authorities have even allowed some extra expenditure for architectural purposes. This is in the case of the Holtenau Lighthouse, near Kiel, in connexion with which a memorial-hall has been erected, known as the "Three Emperor Hall." This Holtenau lighthouse is the scene of the inauguration of the Canal as we go to press.

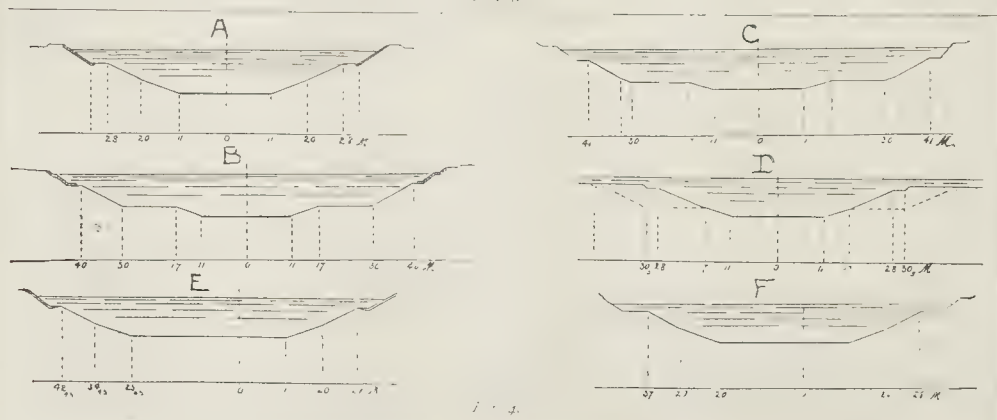
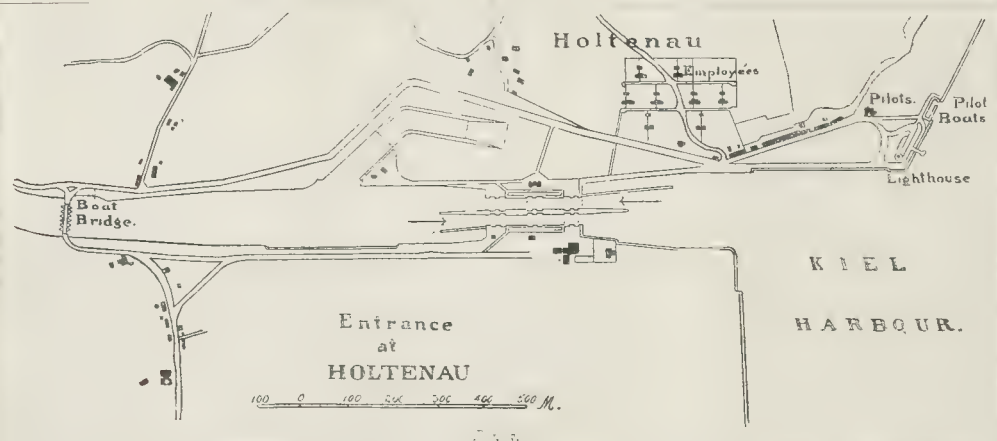
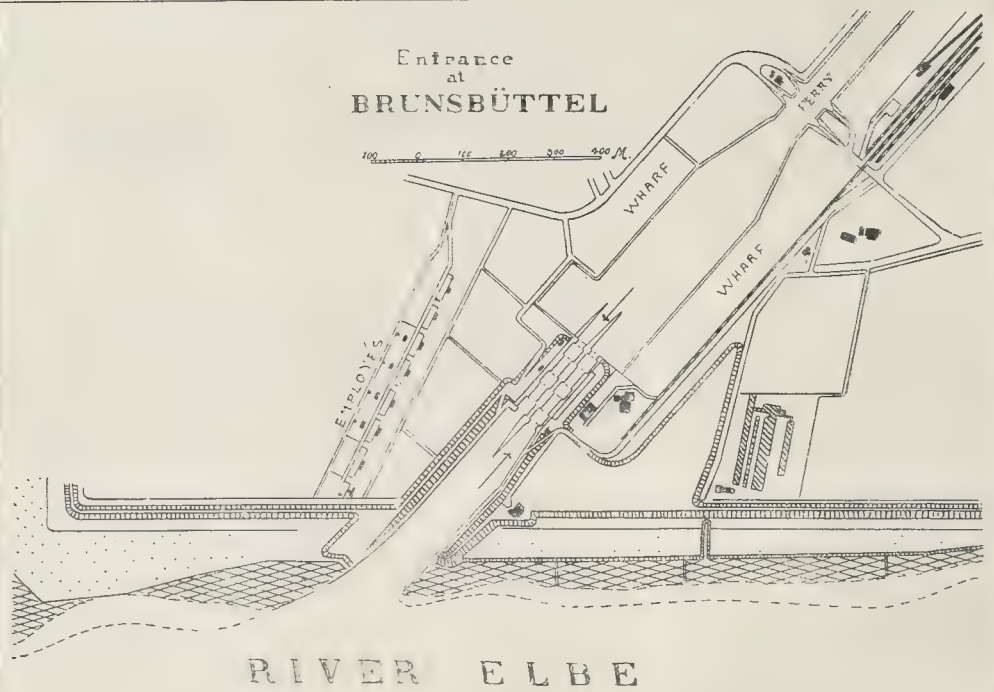
The history of the Canal has certainly been interesting, though the actual period of construction, after the final plans had been decided on, did not include any remarkable



events, and was perhaps at the most only notable for the rapidity and the businesslike way in which everything was carried out. The history of the Canal almost reaches back five hundred years. Some work done in 1391 and 1398, when the rivers Elbe and Trave were connected by a small canal, was the first part of an ambitious scheme of through-traffic between the Baltic and North Sea. This canal still exists. According to the *Deutsche Bauzeitung*, there was an Alster-Trave Canal in 1525 again, as part of an elaborate plan of through communication. The first practical realisation of this plan was not, however, until 1785, when the Eider Canal was completed by the reigning Danish King, Christian IV. Through traffic between the town of Tönning, on the North Sea, and Kiel on the Baltic Sea, was here obtained by making the River Eider navigable and forming a connexion between an upper reach of this river and the Kiel Fiord. This connexion was the Eider Canal proper, with its elaborate system of locks. Considering the date, the construction of the Eider Canal was indeed remarkable, and seeing that ships up to a length of 100 ft. could use this waterway, it had a certain commercial value. The through traffic of late years reached 4,000 ships per annum.

The new Canal, as actually carried out, is the outcome of a series of modern schemes, the first of which dated from 1848. It would lead

too far to give particulars as to the many drawings made between 1848 and the final decision, but we must mention that the most important plans were by "Oberbaurath" Lentze (1864), and "Bauinspector" Boden (1879). Herr Lentze's plans were drawn up in accordance with certain Government requirements, but Herr Boden's scheme was a private commission from a Hamburg merchant, Herr Dahlström, who proposed constructing the canal as a private commercial enterprise. It was practically through Herr Dahlström's energetic initiative after the Franco-German war, that the Prussian Government, and afterwards the German Empire, took the matter in hand from a commercial point of view as well as a military and naval one. Funds, which would otherwise have scarcely been forthcoming for the canal, were very readily voted after due importance had been given to the commercial advantages of the undertaking, and Herr Dahlström's plans served in many ways as a basis for the final working drawings. Prussia, and afterwards Germany, had, of course, long been alive to the military and naval importance of the connection between the Baltic and North Sea, but its value had always been compared with warships and men, and its absence to-day would only give an excuse for further armaments. Herr Dahlström's calculations gave the scheme a different aspect, though pessimists were only too ready to point out



that the Canal only meant a saving of a few days and smaller risks for a class of shipping that is very much inferior to the vessels that use the Suez Canal. No doubt the pessimists are partly right, and to many the great international rejoicing at Kiel will seem an anomaly. The world is celebrating what is principally the completion of one of Germany's new armaments, and rejoicing at the completion of an undertaking which is of but small commercial value outside Germany. There can scarcely be any reason for special rejoicing at the technical achievements. But, for all that, the Canal is certainly of some commercial value to its owners, and the outcome of the systematic industry of a very hard-working people, and Germany may well be congratulated on its completion. We may also congratulate ourselves at the completion, as, if any country benefits from the new canal besides Germany, England will be the first to profit from it, together with Sweden. Our traffic with the Baltic is important.

Herr Dahlström's plans of 1879, together with his financial proposals, were under the consideration of the authorities in 1881. In 1886, the Government finally decided to construct the Canal with national funds, and the works were almost immediately taken in hand. The ceremony in connexion with the cutting of the first sod was a most pompous affair, and was the last important ceremonial in which the late Emperor William participated, while the present Emperor, on his accession to the throne, took every opportunity to show his interest in the undertaking.

Although the country through which the Baltic Canal passes is comparatively level, yet a large amount of work was caused by having to divert roads and railways, as well as various streams met with along the route. No locks are needed, except at the extremities of the Canal, but there those which have been constructed are of large size, being 500 ft. long, 85 ft. wide, and 30 ft. deep. The length of the canal is 62 miles, and it is generally 200 ft. wide at the top, 74 ft. at the bottom, and some 28 ft. in depth.

The plan given as Fig. 1 explains the route of the Canal. The planning of the West entrance, on the Elbe, some two miles from Brunsbüttel, is the outcome of much careful consideration, as numerous difficulties in connexion with the tides and current of the Elbe had to be taken account of, whilst the East entrance, in the Kiel Fjord, has the benefit of not being subject to tides or currents. Figs. 2 and 3 show the two entrances with their double locks and inner harbours. Fig. 4 gives sections of the Canal at various points. There are six passing stations, on the route, of sufficient width to allow the easy passage of two vessels. At each end, and midway, there are pilot-stations. Both at Brunsbüttel and Holtenau, there are ample conveniences for loading or unloading, and there will be sheds for the storage of goods. On the Brunsbüttel section the Canal is higher than the surrounding country, whilst soon after the midway pilot-station, towards Holtenau, the waterway runs between steep embankments. The lines of railway which cross the Canal are either on high-level steel bridges or on low-level hydraulic swing-bridges. We illustrate the two bridges at Grünenthal and Levensau (see lithographs). The most difficult piece of excavation was a long reach through a bog. The difficulties here have been overcome by expensive masonry embankments and constant dredging. Everywhere conscientious workmanship, substantial construction, and neat finish are apparent, and there is little fear of the constant expenditure for repairs so harassing to the finances of other canals.

As to the cost of the Canal we may mention that the estimate in 1886 was 156 million marks, or about 7,800,000*l.*, that there has been a saving of about 35,000*l.*, which sum will, however, be spent on improvements. About 500,000*l.* were to be spent for the ground, according to the original estimate, and 6,000,000*l.* on the actual works. Armament, appliances, stores, &c., together

with a reserve fund for extras (75,000*l.*) completed the total. It is remarkable, in a work of this magnitude, to find that the estimates have not been exceeded, and we may add that this is a very unusual occurrence in German Government works. Had it not been for the difficulties of excavation through the bog, the saving would have been still greater.

As to the management of the works during the course of construction, the Imperial Government carried out everything under the superintendence of its own officials, who were employed by the Home Office. The head-quarters of the staff was at Kiel in charge of "Geheimrath" Löwe, together with the two chief engineers, "Baurath" Fülcher and "Baurath" Koch. "Regierungsrath" Wennecker acted as legal adviser. MM. Löwe, Fülcher, Koch and Wennecker together formed the special commission with whom the responsibility for the works rested. The Canal was divided up into five sections, each of which had its own special works-office. The length of the sections varied in accordance with local requirements.

One of the most interesting features in connexion with the construction of the North Sea-Baltic Canal was the excellent way in which the workmen were housed and cared for. The maximum number of men employed at one time was about 8,000, and most of these were quartered in comfortable camps, in charge of Government superintendents. Each camp consisted of a number of half-timber barracks, one of which was used as an eating-house and canteen, and the others taken up by dormitories. The dormitories had eight beds each, and there were mostly about ten of these in each block. Each block had accommodation in the form of smaller rooms for a number of foremen and gang-leaders. Each camp had its doctor, a small hostelry and a general goods shop, and a washhouse, a sick-room, and a disinfecting chamber were also provided; and the larger camps had special sanatoriums. Great care was taken to give the men their food and drink at cost price, and there were opportunities for boarding at very low rates. Both the contractors and the men were well satisfied with the arrangements, and it is pleasing to hear that many of the skilled artisans, and also a number of the labourers who have been on the works all the time, are now able to retire with substantial savings, thanks to the opportunities afforded them to live cheaply and be thrifty. The employers greatly facilitated any desire to save by allowing the men's pay to accumulate with interest, &c. It is worth note that these arrangements for the workmen were in the hands of the employers, *i.e.* the Government, and not in the hands of contractors. The experiment—for as such we must class it—was certainly a very successful one.

On the completion of important engineering works we generally hear a good deal about the special difficulties that were met with, and the successful manner in which they were ultimately surmounted; but in the case of this large canal few opportunities for the exhibition of unusual resources occurred, yet, notwithstanding this, the work should be of special interest to the engineers of this country.

At the present time it may be said that there is practically but one difficulty in carrying out any engineering work, and that is, to obtain sufficient money to execute it. With plenty of capital at his disposal the engineer of to-day has little to learn respecting the adoption of special methods to overcome difficulties of construction, or the way to carry out work of a different character to that which has been before attempted.

We have yet, however, a good deal to learn on a subject of even greater importance, and it is the lesson which the engineers of the Baltic Canal can teach us in this respect, that makes their work so well worth our careful study. They originally estimated that their canal would cost a certain sum and require a certain number of years for its con-

struction, and now that the work has been completed, it is found, as already observed, that neither of these estimates have been exceeded. Such a result cannot but be highly appreciated by us, who, with all our experience, have hitherto so lamentably failed in accurately predicting the cost of our large works. Until we learn the lesson here taught us, how can it be expected that the public will be anxious to subscribe capital for an undertaking, the cost of which can only be anticipated by considering how many times the estimate is likely to be exceeded?

THE

CONDITION OF THE PARTHENON.

BY MR. SOMERS CLARKE.



VEN those who have not seen the Parthenon feel an interest in the structure; a building which has always held its own as, perhaps, the greatest wonder of refined perfection amongst all the architectural wonders of the world; and, notwithstanding the grievous blows and buffetings it has undergone, its ruins still possess the most extraordinary power of fascination, partly through sheer majesty, beauty, and refinement of form, and partly from the charm of the material, the colour, the situation, and associations.

That this matchless building stands in imminent danger of ruin, even beyond that which has already befallen it, is but too evident.

Notwithstanding the explosion of the powder-magazine within, which burst out the sides of the cella and overthrew the lateral colonnades, and notwithstanding the bombardments which the western front has undergone, still, from a distance, the building stands up and can be appreciated as a whole, owing chiefly to the fact that the western portico is standing, even including its angle cornices, and that the outline of the pediment is still preserved, although shorn, for the most part, of its cornice.

The fall of the angle cornices and their supports would be the entire and final ruin of the structure: a mere skeleton would remain, and it is at these angles that the greatest danger shows itself.

The construction of the building throughout being purely trabeated, there are in the original scheme no thrusts to counterbalance, no arches trying for ever to overthrow their abutments. On the other hand, when stone beams are broken through, they have the trick of acting after the manner of arches, and may often be found to have sunk, until, whilst the crack gapes at the bottom, the two faces of the break are in violent pressure at the top, and the species of arch thus formed is only kept in its place by the resistance of the adjoining masonry—in fact, thrust is established, and that in a structure where the resistance to thrust forms no part of the original design.

The Pentelic marble, of which the Parthenon is built, was selected with the greatest care, any but the best blocks being rejected. The material is splendidly preserved, but after the lapse of more than 2,000 years, during which the marble has been exposed in the building, disintegration seems to be, in parts at least, making its way; and once begun, it may be making rapid progress, only, perhaps, to be made clear to us by the sudden collapse of an architrave under some unwonted, although slight, strain.

Since casts were taken, at the beginning of this century, of some sculptures still in their place, these sculptures have considerably disintegrated. What is going on with the sculptured surfaces is probably going on less manifestly in the great blocks of which the Parthenon is built.

The following notes, accompanied by rough sketches and by a reproduction of a photograph (see separate plate), will, it is hoped, make clear, to those acquainted with construction, in how great peril the Temple stands.

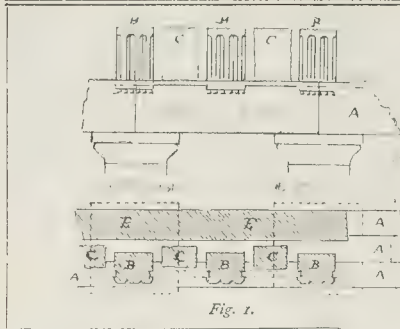


Fig. 1.

The sketch diagrams are not to scale, and are only carried as far as is necessary to assist in explaining what has to be said. The beautiful and careful drawings published by Mr. Penrose, in his "Principles of Athenian Architecture," show, much better than I can do, the methods of construction adopted in the Parthenon; but for those who may not have the book at hand, the rough sketches Figs. 1 and 2 may be of use.

By these it is seen that the architrave is built up of three large slabs, set on edge side by side, and having very ample support at the ends on the capitals of the columns. The vertical joints of these slabs are hollow. The slabs are only in contact for a few inches at the top and bottom, and there nothing can exceed the care with which the joints are made. These slabs are lettered A, A, A. Upon these slabs rest the triglyphs, B, B. The triglyphs are very large blocks, and rest partly on the outer and partly on the middle slabs, A, of the architrave. The sides of the triglyph blocks are grooved to receive the slabs of which the metopes are formed. Behind these slabs are placed blocks of marble, which stand quite free. The purpose of these blocks was clearly to assist in carrying the great cornice stones, and at the same time to do this with much less material than would have been used had the work at this level been all in the solid. The weight on the architrave stones is, by this expedient, considerably reduced. Behind the blocks B and C is a continuous wall E, which rests partly on the middle and chiefly on the inner architrave slabs A, A. This wall carried the stone roof of the peristyle.

The Section Fig. 2 shows that where the cornice still remains the greatest weight is now on the outer stone of the architrave, and the tendency is to fall outward.

At the angles of the temple this outward tendency is very much increased. The triglyph is in these cases a huge solid block, larger and heavier than the triglyphs elsewhere; the cornice overhangs very far, and on its edge lies the sloping mass, at the start of the pediment cornice. As long as everything was in good order these great weights were no doubt counterpoised; but now, with the architraves more or less shattered, the pediments and the magnificent stones of the capitals broken, it seems only wonderful that the slightest earthquake shock does not overthrow the angles.

The sketches Figs. 3, 4, 5, and 6, in conjunction with the photograph, show the excessive danger to which the slightest shock exposes the temple.

Fig. 3 shows the north-west angle of the

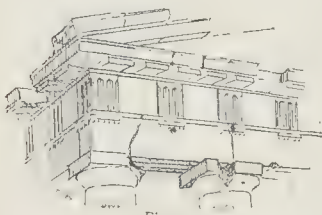


Fig. 3.

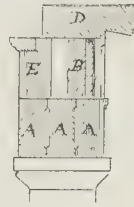


Fig. 2.

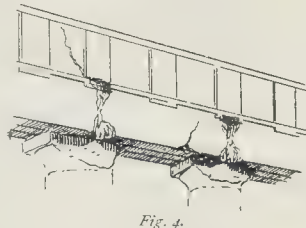


Fig. 4.

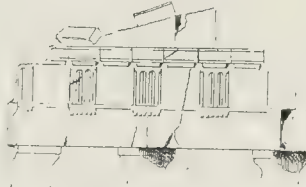


Fig. 5.

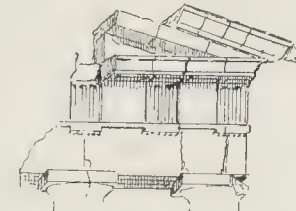


Fig. 6.

west portico. The outer stone of the architrave is cracked through, consequently the great block of the angle triglyph is standing on a very insecure base, and on this block rests the cornice. The abacus and part of the echinus of the angle capital are gone, whilst the capital of the next column southward is broken. The outward stone of the architrave has therefore a poor base. In its fall it would almost certainly heave up the work above it—indeed, the open joints of the masonry at this angle show that there is a slight tendency outward.

Fig. 4 shows the capitals of the fourth and fifth columns of the western portico with the architraves resting upon them. The danger which threatens the outside architrave stones of the third, fourth, and fifth inter-columniations cannot be over-estimated. The capitals of the fourth and fifth columns have their face completely broken away. In consequence, nearly all the support of the outer slab of the architrave, except a very few inches, is gone. The vertical joints of the architrave slabs are hopelessly shattered, and there is an ugly crack developing itself in the architrave of the middle inter-columniation. It seems that these stones are kept in their places solely by the weight of the triglyphs, &c., above tying them back, and by the wrought-iron cramps with which

nearly every block of masonry in the temple is tied to its neighbour.

The S.W. angle of the western portico is in equal danger with that at the N.W.

Fig. 5 shows the south-east angle of the east portico. Here we see the lamentable result of the fall of the cornice. The outline of the temple is entirely lost. The cracks and breaks in the masonry make it evident that, although the great mass of the angle cornice has fallen, there is still a considerable tendency to move outward.

The angle shown on Fig. 6 at the north-east corner of the east portico is perhaps in greater danger than is any other part of the peristyle. Here the abacus and part of the echinus of the capital are gone. The outer architrave stone is cracked in two places. Upon the outer piece which stands out in the air rests much of the great weight of the triglyph, and over this, much shattered, lie the cornice and the first stones of the pediment. As we look at it we only wonder why it does not fall at any moment.

Not only are the outer stones of the architrave broken as above stated, but many of those behind them are in a very precarious state. The insertion of new stones would be not only a thing difficult in itself, but one which would be most fatal to the marvellous effect of colour the ruin now presents to us. Pentelic marble is of a cold sugary white when fresh cut, and takes very many years to mellow. It is beyond question that a great deal may be done with bronze tie-rods, which would be almost, if not quite, invisible.

We cannot too strongly deprecate anything in the way of "restoration," and the insertion of new stones comes very near to this.

SOMERS CLARKE.

NOTES.

WE may congratulate the authorities of Durham Cathedral on the completion of a piece of "restoration," against which not even the most bigoted anti-restorers can bring any reasonable objection, viz., the completion of the rebuilding of the eastern portion of the Chapter-house, which, as mentioned in our article and shown in our plan of Durham Cathedral in the *Builder* of June 3, 1893, was wantonly destroyed in 1796, under the orders of the notorious Wyatt, for reasons (whatever they were) which it is difficult to comprehend even from the Wyatt point of view. The reason we call it a justifiable restoration is that the Western portion of the Norman Chapter-house remained, and therefore the restoration of the destroyed portion was rightly carried out in harmony with the style of the existing portion, as a completion of an architectural design which had been partially destroyed. Had the whole ancient Chapter-house been effaced, and a new one required, we should have objected to the building of an imitation Norman one because the destroyed one was Norman. It is a different thing when half a building or apartment is destroyed; the question of architectural design then comes in, and the new work ought to be restored so as to complete the design. This is a distinction often lost sight of by opponents of restoration, and we may take the opportunity of drawing attention to it again in reference to this case.

THE equestrian statue of Lord Strathnairn, near Albert Gate, which was unveiled on Wednesday, shows a certain degree of originality and special character in the treatment both of figure and pedestal. A considerable amount of gilding is introduced in the accoutrements both of horse and man, which, though it may be objected to as too realistic, certainly gives a better decorative effect, in London atmosphere, than a bronze statue in its ordinary state. The pedestal is treated with six small Corinthian columns, disengaged, but placed in angle nooks and in front of a recess in the centre of each side, so as to throw out the column in front of a shadow. The effect

of this is good, but the mouldings both of the upper pedestal and the base are rather coarse, and we should doubt if the architect's hand had been in them. In regard to proportion, the pedestal and statue group very well when seen from a little way in front, but for a side view, which is the one for an equestrian statue, the pedestal is too high for the width of the site, and throws the statue above the eye too much. The horse is possibly a little stiff in attitude, but is sculpturally in character, and the figure of the rider dignified. The sculptor is Mr. Onslow Ford; whether he is responsible for the pedestal also we have not heard.

THE terms on which the County Council obtains the business of the London water companies, if Parliament decides that the County Council shall become the public water authority, is a matter which chiefly interests the shareholders in the companies. The decision of the Committee last week to allow the arbitrator who may have to settle the amount of the purchase money full discretion to take all matters into consideration is therefore, though of importance to the companies, not a matter of great public interest. From a public point of view it is chiefly of importance as showing that the Committee consider that the County Council have made out a *prima facie* case for their contention that this body should be the authority to manage the water-supply of London. The great point in dispute is now the adverse contention of bodies outside the actual jurisdiction of the County Council that the latter ought not to control the water-supply. If the companies are to be bought out, it is immaterial to them who are the purchasers, and therefore for the present the contest lies between the County Council and public bodies outside the area of the Council.

THE case of *Chastey v. Ackland*, reported in another column, finally disposes of the phrase "the right to light and air." It does so for the good reason that it decides that there is no right in the owner of premises to the uninterrupted flow of air to those premises. The claim is too indefinite; the air is at large, and not within finite limits, and the claim is thus essentially different to one for light, which must come through a definite and well-known aperture. The interruption to the flow of air is, in truth, on the same footing as the interruption of a view: it is an inconvenience, and not a legal wrong. The air may be interrupted so that the premises are less "fresh" than they were, but that is a drawback which must be borne by all dwellers in towns. In fact, if a right to an uninterrupted flow of air existed, it would nearly put an end to towns altogether. Again, too, the case of an interruption of the flow of air differs from the fouling of the air, as by noxious vapours which are borne to a house. This is an active nuisance and a breach of the law. The recently-decided case, though it could have but one termination in the minds of those acquainted with this branch of the law, will do good by putting an end to what is still, to some extent, a popular fallacy.

THE recently-reported case of *Lavy v.* the London County Council is not without instruction, though it must not be regarded as a very binding decision, since it practically rests on a question of fact and not of law. The appellant erected a wall 11 ft. high, 14 in. thick, and this was to be used as an advertising station. It was contended by the County Council that this was a "building structure or erection" within the meaning of Section 75 of the Metropolitan Local Management Act, 1862. The magistrate held that this wall fell within this section, and ordered its demolition, as being beyond the general line of buildings. Against this decision the owners of the wall appealed, and the Court upheld the decision of the magistrate. The judges considered it to be a question of fact whether this wall was a

building structure or not, and as the magistrate had found it was, they would not disturb his finding, since it did not appear to be unreasonable. It is obvious, therefore, that this case is a guide to the discretion of a magistrate or of anyone interested in a similar building, though, as we have said, it is not a decision on a legal principle.

THE question of the use of stencilled decoration has been again prominently brought forward by Mr. Arthur Silver in conjunction with Messrs. Rottman & Co., of Garlick Hill. Stencilling is handwork rendered expeditious, and, therefore, more economical by certain mechanical appliances, which take the name of stencil-plates. In these, as was the case with the "leading" of stained-glass, it was the custom to hide the "ties" as far as possible, whereas Mr. Silver, in the designs on view, has shown that these are of no less value from an artist's point of view than they needs must be from that of a mechanic. This direct and obvious treatment was not popular in the early part of the century, when to approach the pictorial as nearly as possible was the ideal, and to disguise the means employed was considered a laudable achievement. Even during the Gothic revival, the ties of the stencil-plate were invariably painted out so as to imitate handwork. The designs by Mr. Silver, which can be laid on to any substance, from flax, through canvas, and down to wood, are in many respects admirably adapted to the purpose, and the figure-work especially has a decorative value. Another point is that a graduated wash, which is the distinctly "hand-worked" quality of a stencil, is used with good effect, so that a frieze, for example, by the gradation of colour, loses the wearying effect of repetition and becomes an engaging series of decorative panels, full of colour graduating from reds through blues to yellows and back to reds. Beyond the variation in colour, however, it is evident that, built up as they are from many plates, it is easy to combine the various parts in quite new ways, as in one of the designs in which a frieze of bold floral forms has groups of figures introduced here and there in positions where they give an architectural emphasis or importance in a room. It would seem, then, that from a study of these first specimens, that a notable departure in the embellishment of our walls has been initiated, and that stencilling, in which the graduated wash of colour and the acceptance of the structural ties as essentials of the design, may be placed midway between the cheaper wall-papers and the costly fresco.

TWO architects whose names are known to our readers, Mr. E. Guy Dawber and Mr. Langton Dennis, are conjointly engaged on a work on "Old English and Continental Pewter," a subject in which architects and artists are a good deal interested just now. They will be very glad to receive any information concerning fine specimens of pewter-work, especially such as are in private collections. Rubbings of marks would be also welcome. Any communications on the subject can be addressed to Mr. Langton Dennis, at 22, Buckingham-street, Strand.

THE draft regulations for securing the safety of the public recently issued by the Board of Trade to central station engineers and others are meeting with more opposition than they deserve from electricians. The primary object of the Board of Trade is to adequately protect the public, and although the regulations may slightly hamper the development of electricity supply, yet various accidents in the past are responsible for this. The rules which are being most discussed are two of those relating to arc-lighting; the rapid spread of this kind of lighting, due to the introduction of small arc-lamps, naturally interests a great many people in regulations affecting them. The draft rules are—

"47. All arc-lamps shall be so guarded as to prevent pieces of ignited carbon or broken glass falling from them, and shall not be used in situations where there is any danger of explosive dust or gas."

"48. Arc-lamps used in any street shall be so fixed as not to be in any part at a less height than 10 ft. from the ground."

The objection to the first rule is founded on the mistaken assumption that it forbids the use of arc lamps and gas in the same building—an interpretation, we imagine, not contemplated by the Board of Trade. The objection to the second rule is more serious, as it undoubtedly handicaps unfairly arc-lighting in this respect, as compared with gas and oil-lighting. Indeed, if it is to be enforced, it will make arc-lighting of shop exteriors, &c., virtually impossible in some streets. One could understand the rule if arc lamps were all of dazzling brilliancy, but small arc lamps are often of only 200 candle-power, and when surrounded by a good diffusing globe give a most pleasant light. There is no doubt of the great superiority of those small arc-lamps over large glow-lamps of the same nominal candle-power, both as regards economy and efficiency. As people who have used both find out, "you get double the light at a quarter of the cost." The other draft rules at present under the consideration of the Board of Trade are well fitted to ensure to the public a proper and sufficient supply of electrical energy, and at the same time, to secure the public safety.

IN another column we print a letter from a correspondent who suggests that crushed or ground glass might be utilised as builders' sand. He states that a large quantity of black and other glass may be obtained in London for the cost of cartage, and that the expense of grinding it is very small. The suggestion is not altogether novel. In the United States the refuse from glass works is sometimes used both for mortar and cement, though we believe its employment is very restricted. In Germany and Switzerland various proposals have been put forward, from time to time, to employ glass refuse for building purposes, but they do not seem to have come to much, for reasons that will presently be seen. There can be no question as to ground or crushed glass being suitable for mortar; judging from the sample sent us, the small fragments are angular, and, from the mechanical point of view, they leave nothing to be desired. From the chemical standpoint also, there is practically nothing detrimental in the material, though it cannot be quite as durable as pure quartzose sand. The chemical composition of black bottle glass varies exceedingly within certain limits, but it may generally be regarded as being from 50 to 65 per cent. of silica, 20 to 25 of lime, 6 to 9 of potash or soda, and from 4 to 7 of iron—depending on the manufacturer and the class of bottle. Ordinary bottles would have about 54 per cent. silica, 20 of lime, &c. In any case, large proportions of lime, soda, and potash are present, though the bulk of the glass is silica. From the state in which these ingredients exist in the glass, there is very little likelihood of their being able to materially influence the action of the mortar in any way. We cannot see, therefore, why glass sand should not be employed in the manner suggested; it would be purely a question of cost. The reason it has not been adopted to any extent abroad—and this is a point for our correspondent to note—is because with but very little preparation it makes a good brick for use in chemical works, as the material is so little attacked by acids. Bricks thus produced have a specific gravity of only 1.5, and are very strong though somewhat brittle. A glass brick in the shape of a flask has been manufactured in Switzerland for some years; and slag-bricks are well-known. We have often wondered why the Thanet Sand and the Lower Greensand in the neighbourhood of London have not been extensively employed for making fire-bricks; glass-sand mixed in proper proportions therewith would form an excellent flux.

WE have received from the Master of Downing College, Cambridge, an account of the objects of the "National Home Reading Union," and a sketch of its work, as planned for this summer and autumn, a good deal of which is, of course, out of our special province; but we are glad to notice that the prospectus includes the practical study of geography and of the physical features of different portions of the country which are to be visited. To direct the attention of excursionists, under competent guidance (which appears to be provided for), to the physical features of the country they travel over, is a very useful work, and may draw the attention of many to sources of interest in travel which are too much neglected.

BENTLEY PRIORY, between Stanmore and Harrow, is to be offered for sale by auction next week. It stands on the site of a priory whose revenues were enjoyed, at the time of the Suppression, by the monks of Lanfranc's Hospital, or Priory, of St. Gregory, Canterbury, and were given in exchange by Cranmer to the King in 1543. The property was acquired by James Duberly, an army clothier and contractor, who rebuilt the house, Soane being his architect. In 1790 he sold it to James, first Marquess of Abercorn, who made large additions to the residence. Here were collected a valuable set of paintings by the old masters, with several portraits of the Hamilton family, and some choice examples of Sir Thomas Lawrence. During the latter part of George III.'s reign, Bentley Priory formed the scene of many fashionable and celebrated gatherings—its visitors including Sir William Hamilton and Emma, his wife, Pitt, Canning, Scott, Rogers, Lord Aberdeen, Lord Liverpool, and the Duke of Wellington—which made it what we may most readily describe as the Holland House of the Tory Party. It is said that some portions of "Marmion" and the "Pleasures of Memory" were written, or, at any rate, revised, here. The second Marquess and first Duke of Abercorn lived at the Priory, 1832-40, and there Landseer painted his famous portrait-group. In March, 1848, a lease was taken by Queen Adelaide, who died there in December, 1849. Four or five years afterwards, Sir John Kelk, the contractor, purchased the estate, which now extends over 300 acres, and rises to about 500 ft. above the sea-level. Hill House, or the Hill, near North End, Hampstead, which will be offered for sale on Tuesday, also, is notable as having been the home of the late John Gurney Hoare, the banker and philanthropist, to whose strenuous efforts in past years, when bits of the heath were being "granted" away, the public at this day are largely indebted for the movement which resulted in its purchase by the late Metropolitan Board of Works. The house lies by the ancient road to Hendon; the grounds slope down to the west portion of the heath. A plot of ground, in front of his own gates, was secured by Mr. Gurney Hoare in order that it might remain free from buildings, and serve, with his leave, for cricket matches and the like. That plot, about one and one-quarter acre, is covered, it seems, by the projected sale. Grave apprehensions exist that if it is thus sold, with the remainder of the property, which is freehold, his intentions will be frustrated. The London County Council should see to this matter.*

WE learn from Mr. Sekon, the author of the "History of the Great Western Railway," lately reviewed in our columns, that he has come across some interesting specimens of railway carriages of very early date; two open passenger carriages, running on cast-iron wheels, built in 1834, for the Bodmin and Wadebridge railway. These specimens of primitive railway carriages

have been removed to the Eastleigh carriage works for preservation. Mr. Sekon suggests that a museum should be formed of examples of carriages and engines of early date, and railway machinery of other kinds, as a record of the early progress of railways in this country. Such a collection would be an interesting memorial of the most remarkable and rapid development in locomotion which has ever taken place in the history of man.

THE Institute of Painters in Water-Colours has opened what is really, as it is called, an exhibition of "Sketches and Studies" by its members; exhibitions of so-called "Sketches and Studies" being often indistinguishable from those which do not profess to be limited to that order of work. The contents are of very various value, *i.e.*, a good many of them are not of much interest, but there are enough good sketches to make the exhibition worth a visit. Among these may be specially mentioned those by Mr. Towneley Green, especially "Sunrise" and "Moonrise" (159, 160); some broadly-handled sketches by Mr. Huson, including one of "Evening Sky" (72); others by Mr. Frank Walton, Mr. Cotman (a very interesting set), Mr. Wimperis, whose "Broxtton, Cheshire" (239), is particularly fine; Mr. Aumonier; Mr. C. E. Johnson; Mr. Fulleylove, whose collection of architectural sketches, however, hardly does justice to the artist, except "Hampton Court from the Long Water" (353); Mr. Orrock; Mr. C. Green, who sends studies of military figures, &c. Sir James Linton's head of a lady under the title of "Cynthia" (303), is a finished picture, and a good one, with more character in the head than he sometimes affords us. A view of Ely Cathedral, from a point from which it is not often drawn, is one of Mr. Cotman's contributions. The majority of the works of each artist are grouped together—the best arrangement for a sketch exhibition, in which one can thus study each artist's means of producing effect in slight and rapid works.

THE Society of Arts gave a conversazione at the South Kensington Museum, on Wednesday evening, which was largely attended. The visitors were received by General Donnelly. There was no want of entertainments: the band of the Royal Artillery in one court, another band in another court, glee-singing (very good) in the lecture theatre, &c. Nevertheless, we should recommend the Society of Arts, on another occasion, to aim at a conversazione which should present something of interest in the way of exhibitions of inventions, materials, &c., specially related to the objects of the Society. Merely to engage the South Kensington Museum for the evening is a form of entertainment having no relation to the special character of the Society of Arts, and we should suggest that a new departure might be made another year. While referring to South Kensington Museum, we cannot help asking how long the lecture theatre, in which one of the entertainments took place, is to be left with its semi-dome in that mean and disreputable state, waiting for a design made, we believe, many years ago, and never carried out yet. If the idea of carrying it out is abandoned, surely it would be better to admit this, and to finish or decorate the semi-dome in some simple manner, rather than leave it in its present unsightly condition.

THE Hellenic Society, which held its annual meeting on Monday last, under the presidency of Professor Lewis Campbell, has made the usual grant of £100 to the British School at Athens, and it was announced also that a decided effort was to be made to put the school on a secure financial footing. This, we presume, means an appeal for State aid, which it is to be hoped will not be made in vain. It is utterly discreditable that, while the archaeological establishments of other countries at

Athens are well-supported by public funds, our own school should be left without assistance of any kind from the Government of this country.

CONGRESS OF FRENCH ARCHITECTS.

THIS year, as well as last year, the congress of French architects has held its meeting, for the most part at least, away from Paris. Bordeaux, the headquarters of the important Architectural Society of Bordeaux and South-Western France, was the city selected for the meeting at once of the sixth general assembly of the Provincial Association and for the twenty-third Congress of French architects; the city offering this year the additional attraction of an important exhibition, "universal" in character in respect of some of its sections, and organised by the "Société d'Enseignement et d'Economie Sociale," founded in 1803, and called otherwise the "Société Philomathique."

The General Meeting of the Association of Provincial Architects held four meetings, from Friday the 7th to Monday the 10th of June, meetings attended by about sixty delegates from the twenty societies included in the Association, which numbers 525 architects representing fifty-two departments.

The following subjects were discussed at these meetings:—

- Architectural education in the provinces;
- The selection or distinction of those who had a proper claim to the title of "architect";
- Public competitions;
- Professional duties of architects;
- Organisation of departmental and communal work.

These questions, however, were to be brought up again and treated more fully at the meetings of the Congress of French architects.

The visits to the Exhibition and to various architectural monuments of Bordeaux were also made by the members of the Provincial Congress and of the Congress of French architects conjointly. Of these more hereafter. The delegates to the Provincial Congress had also made, before the arrival of the Paris contingent, a nautical excursion on the Garonne, the course of which they followed from Bordeaux to Saint-Macaire; stopping at Langouan to visit the ruins of the château and the ancient Romanesque church, as well as the new church, built in the Transitional style by M. Abadie *filz*; at Rions, a small and little-known town, the fortification walls of which are worth attention; at Cadillac, where there is an ancient church with a one-aisled nave, and a château of the sixteenth century built by the Duc d'Épernon, with fine façades and admirable chimney designs; lastly, at Saint-Macaire, a town of almost Roman appearance, with a Romanesque church of St. Sauveur, decorated with interesting mural paintings, as also remains of the ancient fortifications, houses of the thirteenth, fourteenth, and sixteenth centuries, and a small "Place" still surrounded with its original arcaded cloisters.

The Provincial Association terminated its sixth general meeting by appointing its list of officers for 1895-6, of which M. Journoud, of Lyons, President since the foundation of the Association, was elected Honorary President, and M. Ernest Faugoy, of Marseilles, General Secretary, was elected President; by distributing six medals to building artisans of Bordeaux for meritorious work or for length of service; and lastly, at the meeting of June 10, by giving a welcome to the members of Congress who had come from Paris, by way of Angers, under the guidance of M. Achille Hermant and M. E. Corroyer, Vice-Presidents of the "Société Centrale des Architectes Français."

The excursion of the latter to Angers, on the way to Bordeaux, occupied three days. Leaving Paris on Saturday, the 8th, at 11 a.m., the members of the Congress were met at Angers by the members of the Society of Architects of Anjou. The morning of Sunday, the 9th, was occupied by visits to two important industrial establishments, a saw-mill and a wire manufactory, situated near the gates of the city, and by an excursion to the Angers slate-quarries. These latter proved very interesting, especially in regard to the size of the blocks quarried, in some cases six metres by three, the cutting of the blocks by a specially-made form of circular saws worked by hand, the planing by means of travelling carriages furnished with cutters and working by a rotatory movement, the polishing of slate slabs by marble masons, the cutting up of slabs into roofing sizes by bands of workmen, or often by a workman and his family and friends working

* We read (since the above was in type) that Mr. S. Hoare, M.P., has withdrawn the paddock from the sale.

under his direction, the descent of 100 mètres into the quarries, and the process of blasting by electricity—all these proved sources of great interest, as well as the Beaulieu wine and the champagne produced, in the depths of the quarries, to do honour to the visitors.

At 3 p.m. there was a visit to the Hôtel de Ville of Angers, formerly the "Collège d'Anjou," dating from the end of the seventeenth century, and to the local exhibition ("Exposition régionale"), which included a brilliant fine-art section; thence to the Logis Pincé, converted, under the superintendence of M. Lucien Magne, into a museum of architectural designs and drawings left to the town of Angers by M. Edouard Moll, a native of the place. Thence the visitors repaired to the Bishop's Palace, which contains a Synod-hall of the eleventh century, 20 mètres long by 10 wide, and now reached by a staircase of the Early Renaissance period, and finally to the cathedral of St. Maurice, which contains work of the twelfth, thirteenth, and sixteenth centuries; a building of great simplicity of plan but of noble proportions, and including among its treasures some fine glass-work and tapestry.

After the visit to the cathedral, the members of the Congress met again at the "Vieux Château," built by St. Louis, with numerous towers built entirely of slate, whence a fine view of the town and the valley of the Maine was obtained. In the evening there was a banquet, presided over by M. Corroyer, at the close of which medals struck in commemoration of the meeting were presented to several artisans from the slate quarries.

On Monday, the 10th, visits were made to the church of Saint-Serge; to the Saint-Jean Museum, installed in the three-aisled building of the ancient Hôtel-Dieu or Hôpital Saint-Jean, a hall 60 mètres long by 22½ wide, near which is the square chapel, vaulted on two internal columns. Subsequently visits were made to the Church of the Trinity, a building of the eleventh century with a one-aisled nave, formerly connected with the Abbey of Ronceray; to the "Logis Barrauld," a mansion of the end of the eleventh century, in which are now collected a number of sculptures and models by David d'Angers, among them a model, of one-third size, for the pediment of the Pantheon; and to the Hôtel de Préfecture, formerly the Abbey of St. Aubin, re-built at the close of the seventeenth century. In the evening the party left by train for Bordeaux.

On Tuesday morning, the 11th, at 8.30, proceedings were opened by an address from M. Marius Faget, President of the Architectural Society of Bordeaux, followed by another from M. Achille Hermant, who acted as President of the Congress in the unavoidable absence of M. Ch. Garnier, and by a statement of the business and the visits arranged by M. Roux, Secretary of the Société Centrale.

At ten, there was a visit to the Exhibition, under the direction of M. Hauser, President of the Société Philomatique, with a paper on it by that gentleman, responded to by M. Hermant; and at one, a visit to the Grand Théâtre, with a paper on it by M. Marius Faget, who restored it in 1880.

At half-past three the serious work of the Congress commenced, under the presidency of M. Ernest Paugoy. M. Boileau, Assistant-Secretary of the Société Centrale, gave a statement of the actual state of the subject of architectural education in the provinces, and the arrangements made for the formation of a committee of study, adopted in principle at the meeting at Lyons last year. This committee will be formed thus: each provincial society will furnish from one to six delegates, according as its numbers range—from 25 to over 400; this will provide about sixty members, of whom twenty-five will be elected by societies having their head-quarters at Paris, viz.: the Société Centrale, the Caisse de Défense Mutuelle, the Société des Architectes Diplômés, the Union Syndicats, and the Société Nationale; the other thirty-five being nominated by provincial societies.

In the discussion of the main subject, carried on by M. de Vesly, of Rouen, M. A. Gosset, of Reims, M. Faget, of Bordeaux, M. Boileau, of Paris, and some others, the principal interest of the meeting was concentrated on the communications received from M. Labbé, Professor of Architecture at the Ecole des Beaux-Arts of Bordeaux, the scope of which may be thus summarised:—

The education of architects in the provinces should be carried out in connexion with the already existing art-schools.

The State should have a certain control over the system of instruction, but not absolutely dictate it.

General annual competitions would furnish a means of comparing the results obtained in different art-schools, and at the same time of exciting the emulation of architectural students.

The pupils of the various schools should not enter the National Ecole des Beaux-Arts, except as the result of a special examination.

The pupils, both of the Provincial schools and of the upper class in the Ecole Nationale, should receive a certificate when they have successfully passed the final examination.

There should be a distinction between the pupils certificated by the Provincial schools and those certificated by the Ecole Nationale; the latter preserving the prestige given by the certificate of the higher institution.

It may be observed here, that the adoption and putting in force of these proposals by the Government would give, in a few years, in addition to the list of architects who have passed the examinations for Diocesan Surveyors and for the Monuments Historiques, the following three main classes of French architects:—

1. Architects who have obtained the Grand Prix at the Ecole Nationale des Beaux-Arts.

2. Architects who have obtained the diploma of the Ecole Nationale des Beaux-Arts.

3. Architects certificated by the Ecole Nationale or by one of the Provincial Schools.

This is without counting the pupils who have obtained certificates at the "Ecole Spéciale d'Architecture" presided over by M. Trélat (an institution of much the same type as the provincial schools), and the pupils who have received a diploma or certificate in construction from the Ecole Centrale des Arts et Manufactures of Paris.

The day's proceedings were closed by a paper read by M. Germain Bapst, of Paris, under the auspices of the Société Philomatique, on "The Decorative Arts," in which the author recommended the study of nature, the avoidance of realistic copying, the development of the individual taste and manner of the artist, and the modification of existing styles in accordance with modern requirements.

[The report of the remainder of the proceedings arrived too late for insertion this week.]

THE DURABILITY OF A STAINED-GLASS WINDOW.

THE extent to which a body will be affected by the destroying agencies of time and exposure will depend upon two conditions—first, the degree of intensity of chemical combination between its elements; and, second, the possibility of the formation of more stable compounds by the combination of one or more of these elements with those other elements by which it may be naturally surrounded. Thus, in the instance of metallic iron exposed to damp air, the coating of oxide is formed because it is a more stable substance under these conditions than the iron itself. We must strive, therefore, in endeavouring to make a body permanent, to so arrange its elements that compounds may be formed more stable than it would be possible to effect by any other combination.

In the case of a painted window, the elements composing it and the disintegrating influences by which it is surrounded being known, it is comparatively easy to point out the manner in which it will be acted upon in the course of time, and although, of course, absolute imperishability is not attainable, an intelligent understanding of these causes of decay should at least enable the glass-painter to produce the maximum degree of durability possible under the circumstances.

The operations of glass-painting really consist in establishing upon the surface of the glass layers of an opaque substance (usually oxide of iron) in varying degrees of thickness, thereby producing proportionate variations of light and shade. The iron oxide, before application, is intimately mixed with a fusible flux, which, melting at a temperature only sufficient to raise the glass to a red heat, holds the opaque particles of oxide together and binds them firmly to the surface of the glass. Now it is this low degree of fusibility of the colour-flux that constitutes the weakness, from the point of view of permanency, of a painted glass window.

For if we examine the composition of a glass we shall find that the point of fusion is the determining point of its subsequent stability; the lower the melting-point the less energetic is the combination of its constituents, and consequently the more easily are they separated by the decomposing agencies of the atmosphere.

Glass, as is well known, is a compound consisting of silica combined with various metallic

bases. Silica—occurring in nature as flint, rock-crystal, and quartz—is itself excessively infusible, requiring the intense heat of the oxy-hydrogen blowpipe to melt it; but if it be heated with certain other substances, its fusing-point is considerably lowered and a transparent mass—glass—is the result. Of these substances, the alkalies soda and potash are the most energetic in lowering the melting-point of silica, but the resulting glasses, as might be expected, are the least stable. A glass composed of three or four parts of soda combined with one part of silica, melts at a low red heat, but the glass is entirely soluble in cold water. On increasing the proportion of silica the fusing-point rises and the insolubility of the resulting compound increases; but a point is soon reached—still short of producing a serviceable glass—when the further addition of silica produces opacity. Thus a single silicate of an alkali is totally unfit to form a satisfactory glass. The difficulty is overcome, however, by alloying with the silicate of the alkali a silicate of one of the group of metals whose oxides are known as the alkaline earths. The oxides usually used are, oxide of calcium (lime), for the production of a hard variety—crown, plate, and window glass generally, and oxide of lead for the softer but more brilliant kinds known as flint and crystal glass.

Without going further into the question of the composition of glass, enough has been said to show that the point of fusion is one of primary importance where the indestructibility of the glass is concerned. Now the two chief ingredients of the atmosphere that are destructive to painted glass are carbon dioxide and moisture. These being together exhaled in the breath of the congregation of a church, condense upon the walls and windows as a solution of carbonic acid, and, precisely as such a solution, descending as rain, and penetrating the earth, will dissolve the hardest limestone rocks, so it proceeds to act upon the base of the silicate to produce the more stable carbonate. The action is, of course, extremely slow when compared to the action of more active acids, but it is nevertheless certain, and in the case of fluxes containing a large proportion of base and badly-fired glass, it is astonishing the difference it will make, even in the course of two or three years.

The old glass-painters, probably through mere ignorance of any easier method of working, employed fluxes that were far more infusible, and consequently more permanent, than those now generally used, with the result that specimens of their work exist at the present time in a remarkable condition of preservation. Theophilus thus describes the manufacture of a painting colour in which the black oxide of copper took the place of the red and brown oxides of iron now in use. "Take copper beaten small, burn it in a little pipkin until it is entirely pulverised, then take pieces of green glass and sapphire" (a blue paste used in mosaic work) "and pound them separately between two porphyry stones; mix these ingredients together in the proportion of one-third powder, one-third green glass, and one-third sapphire. Grind them on the same stone with wine or urine, and keep them in an iron or leaden vessel."

Such a colour would be much more permanent than those now employed, and by combining the old flux with the modern brown oxide the advantages of both kinds would be obtained. But there is a difficulty in the way that cannot very well be surmounted by the glass-painter. The glass used by Theophilus and his contemporaries must have been considerably harder than that now generally made for church window purposes, and would thus bear the greater degree of heat necessary to fuse the old colour; but every glass-painter knows that even with the easily fusible colour-fluxes now in use it is often difficult to fire the softer greens and yellows without so far melting the glass as to cause the painting colour to fire away. This process of "firing away" consists in heating the glass beyond the critical point of softness, the iron oxide of the colour then enters into combination with the silica of the glass, forming the pale green transparent silicate of iron, and thus reduces the density of the painting. The hardness of the colour-flux, then, obviously depends upon the hardness of the glass, since it is impossible to use a flux only a few degrees softer than the glass itself.

To recapitulate. The stability of a flux depends upon the quantity of base present in it. This is indicated by the fusing-point, a low fusing-point indicating a high percentage of base and a high fusing-point the reverse. It is thus advisable to use as infusible a flux as possible; but the limit of hardness is regulated by the nature of the glass

itself, since if the degrees of fusion approach too closely, the glass decomposes the colour, the silica combining with the oxide to form transparent silicates.

In conclusion, it would be well to call attention to the importance of the firing operations. In order that the oxide may be thoroughly fastened to the surface of the glass, it should be completely covered by a thin film of the fused flux. This is indicated by the smooth silky lustre of the colour surface after firing, or it may be tested by pouring over the pieces of fired glass, placed in a shallow trough, a little hot hydrochloric acid, and allowing it to remain for some hours. If any of the oxide remains unprotected by a coating of flux it will be attacked and entirely removed by the acid.

To insure this thorough fusing of the flux it is certainly advisable to pass the glass through the kiln at least twice—in the first instance for the purpose of firing the outline, and in the second the subsequent painting. In the class of work known as "one fire painting," in which the outlining and shading are produced in one operation, a rawness is always observable on the surface of the colour, and especially when in this class of work stippling is resorted to, a roughness of surface is produced that is extremely favourable to the destructive action of the atmosphere.

G. E. W.

THE ARCHITECTURAL ASSOCIATION: ANNUAL DINNER.

THE Annual Dinner of the Architectural Association was held on the 14th inst. at the Holborn Restaurant, Mr. E. W. Mountford, retiring President, in the chair, supported by Mr. W. D. Caroe, M.A., the newly-elected President, Sir Arthur Blomfield, Professor F. M. Simpson, and Messrs. H. L. Florence, W. H. Seth-Smith, A. Beresford Pite, T. Stirling Lee, F. W. Pomeroy, W. S. Weatherley, H. W. Burrows, Thomas Blashill, and others.

The toast of the "Queen and Royal Family" having been given from the chair, Mr. A. Beresford Pite proposed the toast of "The Royal Institute of British Architects," and in wishing that body renewed health and increased vigour he said that architects had a great deal to do with health, it being a matter of *sanitas, omnia sanitas*, with them. He was sure that every one would wish well to the Royal Institute, though it might not be endowed with the health with which its members inspired other bodies. They would not desire to wish it well merely because of the benefits which it conferred upon them, a poor students' Association, for they (the members of the Association) felt that the Institute in helping them did honour to itself; but they had met that night really as a representative body, each member of which regarded members of the Institute as fellow-architects, animated to a great extent by the same ambitions as they were, who were brought into contact with the same business difficulties, and the same artistic problems. He ventured to say that a very hearty and cordial spirit of amity ought to exist between every architect and his representative Institute or Guild. He thought it was quite impossible to conceive of the art of architecture existing in England, and being practised by Englishmen, without there being a drawing together in some way, in some place, of those individual practitioners of a common art. If they granted that proposition, they practically granted the necessity for the existence of such an Institute as they had in London. But that Institute could not be healthily representative unless all architects cordially and heartily united in making that body represent their own individual conviction of what was for the benefit of the body politic; and he ventured to say that none of them could be so selfish, in their own little views of life, as to imagine that there was not more than one side, or two or three sides, to the vast variety of artistic and professional problems with which they were brought to face. Discussion of these problems, and co-operation in dealing with them, was essential to their well-being as a profession and as a body of artists. One had only to look at the publications and the work of the Institute generally, to be conscious that a vast amount of necessary work was done by that body. One of the first benefits that the Institute conferred upon students and young architects was access to a magnificent architectural library, and that benefit he did not think could be over-estimated, for an architects' library—for architects, controlled by architects, and carried on by architects—was an essential to their well-being as

students. The next benefit was the students' competitions—the prizes, medals, and studentships offered by the Institute—and it was not possible to deny the vast amount of good done to any art or profession by a representative body judging students' competitive work. But the Institute did other work for which they ought to be thankful. It was only necessary to reflect upon the recent discussion on the Conditions of Contracts to realise what an amount of time, talent, and industry had been given for the benefit of the profession, without any consideration of personal advantage or profit. It was also noticeable that in recent years competitions for public buildings had been in most cases successfully adjudicated by nominees of the Royal Institute of British Architects, and in this connexion he could not but think that with a little increase of organisation among themselves, and a definite increase of organisation among members of the Institute, the recent practice of appointing assessors by the Institute to control competitions could be extended, and the good resulting to the profession would be considerable, and especially to the younger members, to whom competitions were the golden ladder to success. Then the Institute bestowed upon them a journal of proceedings and transactions, as well as a liberal education in professionalism. But notwithstanding all this, one was forced to ask a very pointed question, viz.:—Had the Institute resolved that it is quite impossible for it to do anything to further the interest of architecture as an art? They could all admit what the Institute had done, as a profession for the profession, but as an Institute of Architecture, surely they might hope that the renewed health and increased vigour which they were wishing the Institute might produce some artistic activity, and that that activity would cause some artistic influence to be brought to bear on behalf of the profession as a body. He knew it was very difficult to achieve any influence upon art through the medium of interference. The interests of art and architecture were far above the preservation of historical relics, and he could not help hoping that the Institute would set itself the task of trying to solve the problem of how best to further the interests of architecture. In his opinion, in what the Institute did already for its younger members was to be found the germ of what it might do for the art of architecture as a whole. The competition for prizes might be indefinitely extended. The Institute might be in a position to offer prizes for the furtherance of the art of design, for the study of decoration, for the production of fine detail, for the production of fine work in any craft in which the art is associated, on a much grander and more important scale than was at present done in regard to the students' prizes. Again, why should not the Institute establish a school of design by inaugurating a series of awards in design? He did not see that it was impracticable. And why should not the gold medal be awarded every year to the architect who, in the opinion of his brethren as a body, produced the most original design in that year, or the design of most benefit to architecture at large? Why should the Institute, in short, only concern itself with professional matters relating to a business man's career? He did not think that the suggestions he had made for the Institute to step out of professionalism and bestow its wisdom and intellect on architecture and architectural work, were beside the mark; certainly, they would all hope that the Institute might have renewed health and vigour in addition to its other usefulness to further the art of architecture.

Mr. H. L. Florence, in response, said that it might be inferred from the remarks of Mr. Pite that the two bodies were separate and distinct, but the distinctions which existed were more in matters of form than in reality. One difference was that the Association was yearly able to have a dinner, but an Institute dinner was a very rare occurrence indeed, and that fact suggested that the Association was in a better financial condition than the Institute. As to the points of resemblance, most members of the Institute had been or were members of the Association, and in similar feelings and ideas as when they held similar offices in the Association. Early opinions were modified by time, and he was looking forward to seeing Mr. Pite occupying a seat on the Institute Council, when it was not unlikely that he would speak and act very much as he (the speaker) or any other member of Council did. He thought that the Institute and the Association really might be considered to form two grades of members of one large body. In listening to Mr. Pite's remarks he had been hoping to

hear from that gentleman how he proposed to carry out his ideas. His singular suggestion, viz., the promotion of architectural art by means of prizes, if it was to be taken seriously, would first of all have to be considered in its financial aspect, for the Institute had no funds with which to establish a series of gold medals. And in this connexion he might say that he had recently noticed, with some amount of surprise, the large sums of money spent by the Association on meetings of a festive character. It seemed to him that the donation of the Institute to the Association did not suffice to pay for them. Another point which he should not like them to forget was that the Institute was not an Institute of London architects only, but of the architects of Great Britain. The affairs of architects in the Provinces received a large amount of attention by the Institute, and a large proportion of its extremely inadequate funds was expended on behalf of the Provincial architects. There was no immediate or definite gain to be shown, but their action tended to maintain the good fellowship which the Institute endeavoured to promote among architects in every part of the United Kingdom. Any efforts which the Institute might make in the future for the cultivation of architecture as a fine art depended very much upon the votes of its members. The Institute policy was largely governed by those who were sent by their societies to become members of Council, and that that policy was generally approved was evident from the fact that there was very little change, from time to time, in the constitution of the Council.

Professor F. M. Simpson, of Liverpool, then briefly proposed the toast of the "Architectural Association," and in doing so said that it was a matter for admiration that the Association still kept to its old love of education, going steadily ahead in spite of all opposition, and improving year after year its scheme of education for architectural students. Considerable change in the work of the classes had taken place since the old days, and no doubt there would be still greater changes in the future. The toast was coupled with the name of Mr. W. H. Seth Smith.

Mr. Seth Smith, in reply, said that an important body was being gradually evolved out of the Association. There could be no doubt that architects in England, just entering the profession, looked to the Association as being a body by whose help they could obtain the best training. The scheme which had been working for two or three years was a very bold one, but he felt quite confident in saying that it had been a great success; though, at the same time, he thought that some modification of it would be necessary—a view in which he did not stand alone. Success in the future could be no less than in the past, and he looked forward to a very great impetus in their educational scheme. They must not be forestalled, and they must go boldly forward. It was his great ambition to see the Association occupying the leading position in the education and training of architects, and he thought that they should not only have evening classes, but day classes as well. There could be no, or very little, difficulty about that, for those who employed young architects would be quite willing to shorten the period of apprenticeship, and also to reduce the premiums, if their pupils had already had considerable training. What crippled the Association most was the inadequate premises which they occupied, and it seemed extraordinary that the money could not be found for the purpose of building suitable premises.

Mr. Banister F. Fletcher then proposed the toast of "Instructors and Studio Visitors," coupled with the names of Mr. F. R. Farrow and Mr. T. Stirling Lee.

Mr. F. R. Farrow, in reply, said that they tried to teach students to learn for themselves. They not only prepared men for the Institute examinations, but also to become good architects, teaching them architecture and not mere cramming. As, no doubt, some of them had heard, their classes had not been attended quite so well in the past session as previously, and he thought that one reason was to be found in the eight hours' movement for students who had been working all day for their masters, had little time or inclination for evening work. Then it had been thought that perhaps their instruction was a little too thorough, for some of their students did not want exactly the kind of education which they received in the classes of the Association, but an education which would enable them to pass the examinations. The question involved in this was an important one, and was receiving very careful attention from the Committee. On the one hand they had to consider the high ideals

with which the new curriculum was first started, and, on the other, the financial aspect of affairs.

Mr. Stirling Lee also responded. They were doing, he said, the highest and best thing in endeavouring to combine the arts, and in bringing all their students in association with those men who were trying to work out all the problems connected therewith.

Mr. F. T. W. Goldsmith, in a humorous speech, proposed "The Visitors," coupled with the names of Mr. H. W. Burrows and Mr. W. S. Weatherley, both of whom replied.

The Chairman then gave in appreciative terms the health of the new President, Mr. Caroe, mentioning, in the course of his remarks, the qualifications for that office which their new President possessed.

Mr. Caroe replied, and concluded by proposing the health of the Chairman.

The Chairman briefly replied, and then gave the concluding toast, "The Retiring Officers," coupled with the names of Mr. F. T. W. Goldsmith and Mr. F. G. F. Hooper, both of whom responded.

ARCHITECTURAL ASSOCIATION SUMMER VISITS.

I.—BICKLEY PARK.

SOME five-and-twenty members of the Architectural Association visited Bickley last Saturday to spend an afternoon in the inspection of various buildings erected from Mr. Ernest Newton's designs. The first of these was the fine range of stabling for Bickley Hall, comprising accommodation, not only for horses and carriages, but also for cows and other farm stock. The stalls are arrayed round a courtyard with carriage-houses on one side, stalls, horse-boxes, and washing-room opposite; mess-rooms, harness-rooms, and similar necessities on the entrance-front, and the cow-shed opposite. The arrangements of the cow-shed and other farmyard accompaniments furnished the text for an instructive peripatetic discourse by the bailiff, Mr. Morgan, who, in the unavoidable absence of the owner and the architect, conducted the party. A separate block of buildings contains the piggeries, with slaughter-house and boiling place, and the fowl-house. Here much useful specialised information was obtained by the visitors. Amongst other points experience has here shown that tiles from Sevenoaks, though charming in colour, are not to be implicitly relied upon for durability.

Leaving Bickley Hall, a circular walk brought the party first to "Beechcroft," a moderate-sized house, very charmingly arranged with a picturesque group of stables. By the kind permission of Mr. Fodmore, the visitors were allowed to see and enjoy the interior as well as the exterior, and a good example of unpretentious, but well thought out, design they found the arrangement of the dining-room, drawing-room, staircase, and entrance particularly, full of character, convenience, and comfort. Continuing their walk, the members passed by and inspected the exterior of two other houses erected from Mr. Newton's designs, and so returned to the station.

ROYAL ARCHITECTURAL MUSEUM AND WESTMINSTER SCHOOL OF ART.

THE annual general meeting of the Royal Architectural Museum and Westminster School of Art, was held at the Museum, No. 18, Tufton-street, Dean's Yard, Westminster, on the 14th inst., Mr. W. C. Cocks occupying the chair during the first part of the proceedings, and among those present were the Duke of Westminster, Sir W. de Souza, Sir Arthur Blomfield, Mr. Aston Webb, Mr. C. F. Hayward, Mr. W. Fahn, and Mr. W. Ford.

The report of the Museum and School of Art stated that the Council had to record the death of no fewer than three of their Vice-Presidents, the Lord Viscount Hardinge, Sir E. A. H. Lechmere, Bart., and the Right Hon. Sir A. H. Layard, G.C.B. They had also to express their deep regret at the resignation of the office of President by the Lord Bishop of Ely (Lord Alwyne Compton). The Council, in the emergency occasioned by the retirement of their President, resolved to approach the Duke of Westminster, K.G., and invite him to undertake the office; and his Grace had accepted the invitation of the Council. The Council referred with satisfaction to the balance-sheet for the past year, which presented a most favourable account of the finances of the Institution; for whereas in 1893 there was a considerable deficit on the year's operations, this was more than counterbalanced

by the surplus in 1894. This was due mainly to two causes—first, to the rapid growth of the Westminster School of Art, the fees from which amounted in 1894 to 898*l.*, as compared with 700*l.* in 1893; and secondly, to the grants received from the Technical Education Board of the London County Council, amounting to 380*l.* They still, however, regretted that the source of income which, above all others, should be well-maintained, namely, that derived from the subscriptions of members of the architectural profession, was still chiefly confined to the fast-decreasing body of gentlemen who had from the establishment of the Museum accorded to it their generous and valued support. The progress of the School of Art, referred to in last year's report, had not only been maintained, but had steadily increased. The results of the examinations held in May, 1894, were not so productive as in 1893, the grant from the Science and Art Department amounting to 176*l.*, as compared with 206*l.* in the previous year; but it was to be observed that exceptional success in one year invariably places the next at a disadvantage, for the attainment of the highest successes precludes students from further competition in the same subjects, whilst minor successes place a limitation on future results. On the whole, however, there was no reason to be dissatisfied, but the contrary, especially as the school never departed from its ordinary course of study in order to suit examination requirements. John Gabriel Hardy, one of the students at this school, was successful last year in gaining a National Scholarship at South Kensington, with a maintenance allowance. With a view to the further development of the Westminster School of Art, which was much in need of additional room, a special grant of 100*l.* had recently been made by the Westminster Free Studentship Trust, as the nucleus of a fund for the rebuilding or enlargement of the school.

The minutes of the last meeting having been read and confirmed,

Sir A. W. Blomfield, in proposing that the Duke of Westminster be elected as President of the Museum and the School of Art, said it was a matter of great satisfaction to know that they were not inviting him to become President of a moribund society, which the museum was becoming a few years ago. The financial position of the Museum was much better, though that was not owing to any increase of support which might have been expected from the architectural profession and those interested in the Museum and its primary objects, but simply to the great and continually increasing success of the Westminster School of Art. But for that School the Museum must have been closed long ago, but now they had obtained a new lease of life, and he hoped that the Museum would yet receive more pecuniary support, and arouse a little more enthusiasm than it apparently did, from the members of the profession.

Mr. Aston Webb seconded, and the motion was agreed to unanimously.

The Duke of Westminster, in replying, said that if he could in any way help on the work in which they were engaged, he should be most happy to do so.

The new President having taken the chair, other officers for the ensuing year were elected, including the following gentlemen, who compose the Council:—The President, Hon. Treasurer, and Hon. Secretary; Mr. Walter Carew Cocks, Vice-President; and Messrs. C. F. Hayward, F.S.A., Sydney W. Lee, William Pain, J. Hungerford Pollen, M.A., J. P. Seddon, and Aston Webb. Representatives of the London County Council: Lord Ilchester, Sir Walter E. de Souza, Mr. Sidney Webb, and Dr. Garnett.

The Report of the Council and the balance-sheet for the past year were also agreed to, and Messrs. W. Pain and P. D. Leake were re-elected auditors.

A vote of thanks to the President for presiding terminated the proceedings.

THE ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.

THE Association of Municipal and County Engineers held a combined Lancashire and Northern Counties district meeting on the 15th inst. for the purpose of inspecting the Thirlmere reservoir of the Manchester Corporation Waterworks and the Syentite Granite Quarries of the Threlkeld Granite Company. There was a fairly large attendance of members, amongst those present being the President (Mr.

A. M. Fowler, C.E., of Manchester), Messrs. E. Pritchard, London and Birmingham, J. Cartwright, Bury, T. Cole, Westminster, F. S. Button, Burnley, Smith, Dalton-in-Furness, Spencer, Newcastle-on-Tyne, Taylor, Newburn-on-Tyne, and others, mainly from the north of England.

A visit was first paid to the Threlkeld Granite Company's work, where a "blast," which brought down about 2,000 tons of rock, was successfully brought off, and the process of hand-dressing road-sets, of machine-sorting Macadam into various sizes, and of making cement flags was exhibited. The members then drove through the beautiful St. John's Pass to the Thirlmere reservoir of the Manchester Corporation Waterworks. The Thirlmere scheme was prepared by the late Mr. J. F. La Trobe Bateman, F.R.S., the engineer of the Longdendale Works, in connexion with Mr. G. H. Hill, C.E., who has carried it on on behalf of the Corporation, Mr. Bateman having died on June 10, 1889.

The following are some of the measurements:—

	Ft. In.
Levels of lake (above sea-level)	553 2½
Levels of lake when raised 20 ft. for the supply of the first instalment of 10 million gals. a day	554 0
Level when raised to full extent of 50 ft.	584 0
Length of lake when raised 20 ft. ...	3 500
Length of lake when raised 50 ft. ...	3½ 220
<i>Drainage Area to Lake.</i>	
Natural drainage area	7,400
Additional drainage area, to be hereafter diverted into lake when required 3,600	—
	11,000

Area and Capacity of Lake.

Natural area, 330 acres.
When raised 20 ft. for the supply of the first instalment of 10 million gallons a day: area, 565 acres; capacity, 2,534 million gallons.
When raised to full extent of 50 ft.: area, 793 acres; 8,135 million gallons.

Compensation Water.

	Gals. per 24 hrs.
Quantity of water to be discharged into St. John's Beck before diversion of additional drainage area into lake	4,126,125
When lake is raised to full extent of 50 ft.	5,520,487

Embankment at Lake.

The level of the lake is raised by means of an embankment, constructed at the outlet into St. John's Beck.
The top of the embankment is 6 ft. 3 in. above the level of the lake when fully raised.
Length of embankment, 857 ft.
Width at top of embankment, 18 ft. 6 in.
Greatest height of embankment from foundation, 104 ft. 6 in.

Roads.

Length of new roads constructed by the Corporation, 8 miles 1,130 yards, viz.:—

	Miles.	Yards.
West side of lake	5	965
East side of lake	2	242
Across embankment	—	1,683

Aqueduct.

Aqueduct constructed to convey 50,000,000 gallons a day.
Diameter of aqueduct, 7 ft.
Fall of aqueduct, 20 in. per mile.
Length from Thirlmere to Manchester, 95 miles 1,642 yards, viz.:—

Tunnels	14½ miles.
Cut and cover	36¼ "
Pipes	45 "

Diameter of straining well for the emission of water into the aqueduct from the lake, 37 ft. 6 in.

The rainfall over the watershed varies from 52 to 137 in. per annum.

The storage, when all the works are completed, will provide 50 million gallons of water per day for 150 days, even if no rain falls during that time, without drawing below the original margin of the lake.

It is intended to bring the supply by instalments of 10 million gallons a day, at such intervals of time as may be found necessary.

The purchase of the watershed, including the lake and the wayleave for the tunnels and cut and cover, and for the laying of five lines of syphon pipes across the valleys from Thirlmere to Manchester, and the works as carried out, &c., all the

tunnels and cut and cover or concrete tunnel constructed near the surface of the ground to convey 50 million gallons per day, and one line of pipes to convey 10 million gallons per day to Manchester, will cost, roughly, say 2,500,000*l.*

When the five lines of pipes have all been laid and the lake raised fifty feet, it is estimated that the cost will be between four and five million pounds sterling.

The first contract was let at the latter end of 1885, and the works for the supply of the first instalment of 10 million gallons a day completed and opened October 12, 1894.

The members were entertained to luncheon by Mr. Harkewitz, at the "Keswick" Hotel, immediately after their return to Keswick. After luncheon,

Mr. Harkewitz said that the members of the Association had been afforded an opportunity of seeing two works in which Municipal Engineers were interested—the Thirlmere Water Scheme of the Manchester Corporation, and the stone works of the Threlkeld Granite Company. He said that the Threlkeld Company used only one class of stone for roads setts, so as to supply a thoroughly non-slippery sett. The concrete flagging manufactured by the Threlkeld Granite Company was hand-pressed, as their experience proved that machine-pressed flags were deficient in moisture and cement, and did not make a tough flag. He reminded them that the City Engineer of Liverpool had said, concrete is the pavement of the future for footpaths.

The President, in proposing the health of Mr. Harkewitz, said that he had thrown open his works, in all branches, to their inspection, and had, so to speak, imparted to them the secrets of his trade, as he had freely explained the methods appertaining to the manufacture of the concrete flags. The specimens of concrete flagging, and of granite setts, which had come under their inspection, were beyond criticism.

The toast having been honoured, Mr. Harkewitz replied.

Mr. J. Cartwright (Bury) proposed the Corporation of Manchester. He said it was of great interest to Municipal Engineers to have an opportunity of seeing the Thirlmere works. The scheme ranked as second to none in the country as a great undertaking for supplying water; and though there was not as much work in Thirlmere as in some reservoirs they had seen, the thought, care, and engineering skill which had been bestowed upon that great scheme called forth the admiration of every engineer in the country. The Corporation of Manchester was a very bold Corporation, with large ideas, which it carried out with thoroughness.

The toast having been honoured, Mr. Benton, who has charge of the Thirlmere reservoir, responded.

Mr. E. Pritchard, Birmingham, proposed "The Visitors." He said he had never seen stone works which pleased him better than those of the Threlkeld Company. It was an act of kindness on the part of Mr. Harkewitz to throw open his works without the slightest reserve and give them the fullest possible insight into his methods of manufacture. He believed the Threlkeld stone had only to be better known to be more appreciated. The Thirlmere works were model works, not only for the Kingdom, but for the world, and he could not help feeling that the Corporation of Manchester had done them a great kindness in allowing them the privilege they had enjoyed.

The Vicar of St. Mary's responded.

Mr. Pritchard, Birmingham, then proposed the health of the President. He said that, looking back over Mr. Fowler's year of office, they would find he had done as much, if not more, than any other President of the Association.

The toast having been honoured, the President, in acknowledgment, said he desired to thank the members of the Association for the kindness with which they had supported him during his year of office.

The meeting was adjourned to the annual meeting at Halifax on June 27, 28, and 29.

COMPETITIONS.

SHOPS, &c., PRESTON, LANCASHIRE.—The following is the result in the competition for fireproof shops, offices, and two hotels, &c., Preston, Lancashire. First premiated design, Messrs. Essex, Nicol, & Goodman, Newhall Chambers, Newhall-street, Birmingham; second, Mr. E. W. Johnson, Albany Buildings, Lord-street, Southampton; third, Mr. G. G. Hoskins, F.R.I.B.A., Darlington.

Illustrations.

EAST FRONT OF THE PARTHENON.

THIS view of the east front of the Parthenon, from a recent photograph, is inserted as an illustration of the article by Mr. Somers Clarke on another page, as giving a general idea of the present state of the building.

INSTITUTION OF CIVIL ENGINEERS:

FOUNDED IN NEW BUILDING.

For many years past the premises at Nos. 24 and 25, Great George-street, Westminster, lately occupied by the Institution of Civil Engineers, have been found totally inadequate for its constantly-increasing numbers, especially as regards the library and the office accommodation.

Many schemes for enlargement have been, from time to time, proposed, and last year I was instructed to prepare designs for the entire rebuilding of the premises on the sites of Nos. 24, 25, and 26, Great George-street, and my plans, with some modifications, having been approved by the Council, the new building was commenced in October last, and it is expected to be sufficiently completed for the use of members by November, 1895, leaving only the decorative work of the interior to be undertaken during the recess, 1895–96, or at a future time.

It will be seen by the plans that the whole of the basement is utilised for furniture and book stores, caretaker's-rooms, and other domestic accommodation, and for purposes of heating and ventilation of the building.

On the ground floor the offices (*all en suite*) occupy nearly the whole of the façade, the entrance being placed at the west end. The staircase (which goes the whole height of the building) is placed centrally. From the inner hall is entered the Council-room and the reading-room (60 ft. x 30 ft.), and there is a private staircase for the use of members of Council, from the Council-room to the lecture theatre.

An hydraulic lift is provided available for passengers or goods from the basement to the top floor.

On the first floor the library (87 ft. by 30 ft.) occupies the whole façade, and on three sides of this room are galleries fitted with bookshelves. It may here be noted that the Institution at present possesses about 28,000 vols., increasing annually by about 900 vols. In the new building there will be accommodation for about 56,000 vols., thus allowing for the expansion of the contents of the library to double the present amount.

At the rear of the library, divided by the main staircase, is the lecture theatre (60 ft. by 40 ft.), and an additional library (40 ft. by 24 ft.) all on one level, and being arranged practically *en suite*.

On the second floor over the large library is a room of like size, to be used as additional library and reading-room, museum, &c. This room is capable of being divided into three by sliding doors. Two additional rooms for storage of books are on this floor.

The architectural façade is simply treated in the Italian Renaissance, and it is intended to convey the notion of strength and solidity, characteristic of the civil engineer and his work.

In the expanded frieze over the columns, which form the features of the façade, and divide it into suitable window bays, are seven circular niches intended to be filled with portrait busts of the most distinguished English engineers who have passed away, leaving their achievements behind as incentives to their successors in the present and the future.

For the front, Portland stone from the Whited will be used, of which special selection is made from time to time by the architect at the quarry.

Polished granite is slightly used in the front, but only in purely decorative features of the design, so as not to disturb the effect of simplicity and solidity.

As Great George-street is 60 ft. wide it will fortunately be possible to obtain a view of the building slightly foreshortened only.

The foundations have been necessarily carried to a great depth through the treacherous super-soil which extends throughout Westminster.

The interior, as far as used or seen by the public, is treated richly, the main staircase having its steps, landings, columns, and pilasters of solid marble in various and harmonious colours.

The interior of the lecture theatre is treated in an architectural manner, the walls being divided

into bays by an order of pilasters, whilst the ceiling, which is practically a large pendentive treated in glass, rests on a large groined cove springing from the entablature of the said order. This cove contains over each bay panels wherein may be inserted from time to time medallion-portraits of civil engineers in the future who may be deemed by their contemporaries worthy of the honour.

The library, which is a most important feature in the Institution, is to be finished throughout in oak, richly carved, and the ceiling will be also elaborately treated in fibrous plaster. It is believed that the library is unique as a professional one, both as regards reference and study.

An additional store library (to be used also as a museum), is over the main library, and is treated in a much simpler manner and lighted from above. The Council-room, reading-room, and offices on the ground floor are handsomely but more plainly treated.

The buildings throughout are fireproof, the floors being constructed on the system of Messrs. Fawcett & Co., of Queen Anne's Gate, Westminster. The constructional ironwork of roofs, and the wrought-iron floor girders, will be executed by Messrs. Barry & Higham, engineers, of Old Broad-street, London.

The contract for the building has been taken by Messrs. Mowlem & Co., of Westminster, at the sum of 41,000*l.*, and they are using the most strenuous efforts to fulfil their contract by the above-named time.

The above sum is exclusive of fittings and artistic decorations of the interior, and a further considerable outlay may be expected to be made by the Council, who are animated with a desire that the new house of the Institution shall be as good and as handsome as it is felt it should be for so important a body.

Among the sub-contractors may be mentioned, Messrs. Burke, for the marble and mosaic work; Messrs. Jennings for the sanitary works, fittings, and plumbing; Messrs. Jenkes for heating and ventilation; and Messrs. Wilkes for metallic cement, which will be considerably used for the flooring and other features.

CHAS. BARRY.

MOORGATE COURT: ENTRANCE HALL.

WE publish to-day a drawing of the entrance hall at Moorgate Court, E.C. It will be remembered that a drawing representing the main front of this building was hung in last year's Academy, and the drawing we now reproduce is in this year's Academy.

Moorgate Court adjoins the Institute of Chartered Accountants, and contains more than 100 rooms; the drawing represents the principal hall and staircase, with a passage-way to lift.

The whole of the wall surfaces have been treated with marbles, the object being to secure a permanent form of decoration of a richness worthy of an important building, and, at the same time, to ensure perfect cleanliness.

The plinth, dado, dado moulding, have been executed in "Verde Ferrato," whilst the wall filling has been treated with 9-in. bands of Pavanazzo alternating with 3-in. bands of ancient rich red St. Ambrosio di Verona. The treads and risers throughout are of Piastrella, and the newels and pendants as well as the archways over, are of pure white statuary marble.

The ceilings and soffits of the staircase, together with the friezes, are in decorated plaster-work. The balustrading is of wrought-iron and brass, and the handrail is of brass.

The architect is Mr. H. Huntly-Gordon; the marble work was executed by Messrs. Farmer & Brindley, the decorative plaster-work by Messrs. Jackson, and the wrought-iron work by Messrs. Jones & Willis.

BRIDGES OVER THE BALTIC CANAL.

IN order to carry the various roads and railways over the Baltic and North Sea Canal, it was necessary to construct several large bridges, the most important of which are those at Levensau and Grünenthal. These, as will be seen from our illustrations, are high-level arched bridges of considerable size, the largest, that at Levensau, having a span of 540 ft. and a height above the Canal of 140 ft., sufficient to permit the largest vessels to pass under it.

The bridge at Grünenthal is not quite so large, the opening being some 520 ft. The braced arches forming this bridge are gradually reduced in depth from the centre towards the abutments. These arches are pin-jointed at their ends, and

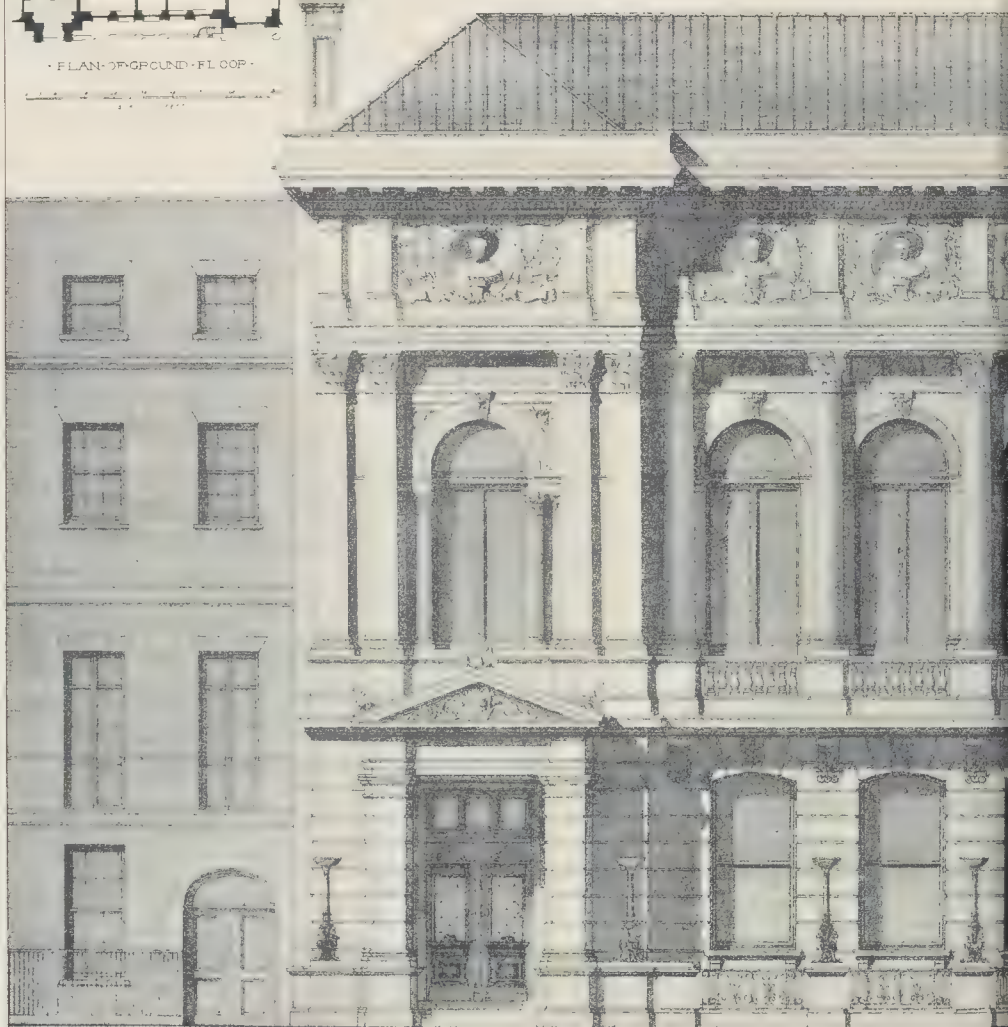




• PLAN OF GROUND FLOOR •

• THE • INSTITUTION • OF • CIVIL • ENGINEERS •

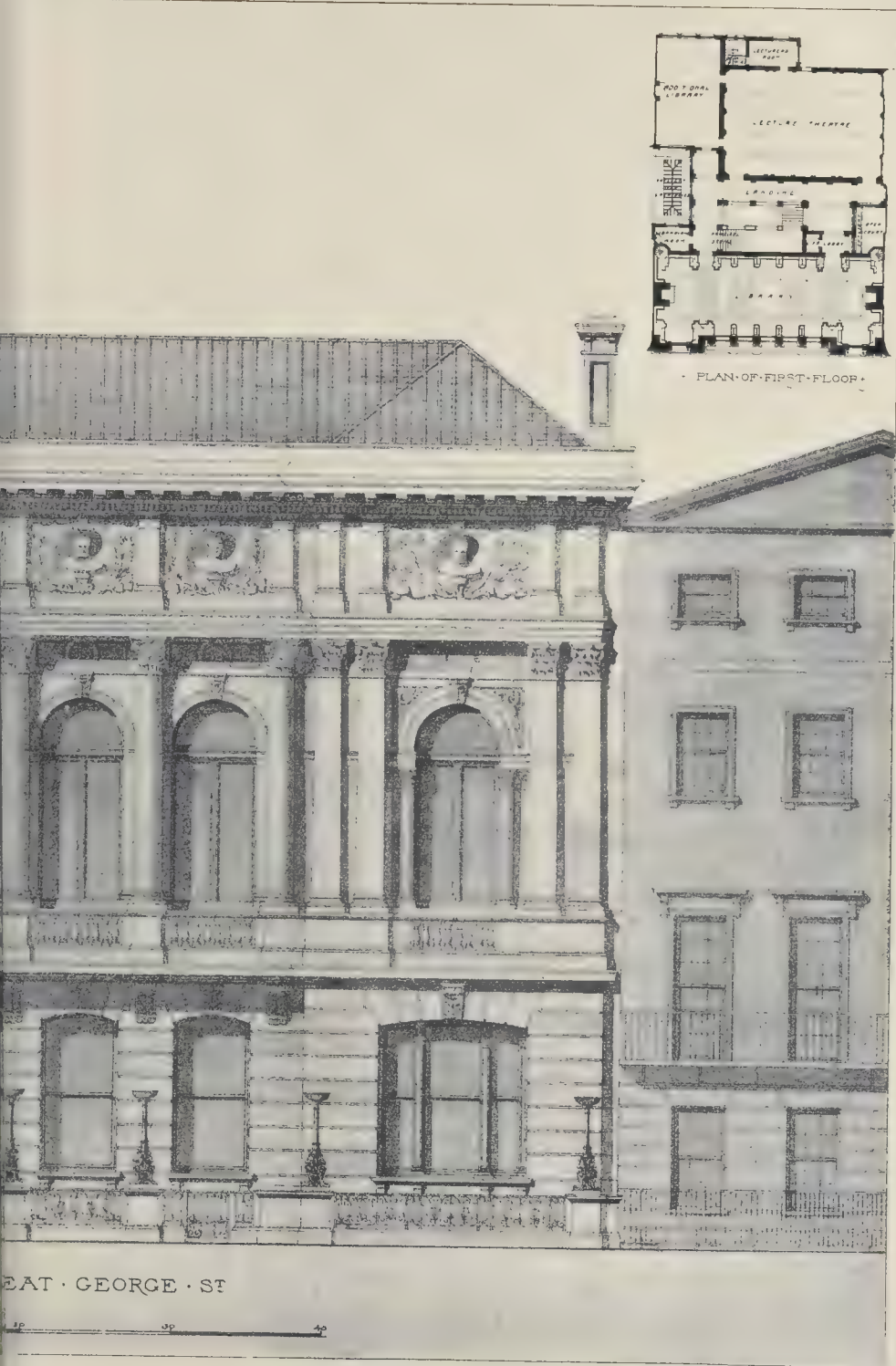
Charles Barry Esq.
1841

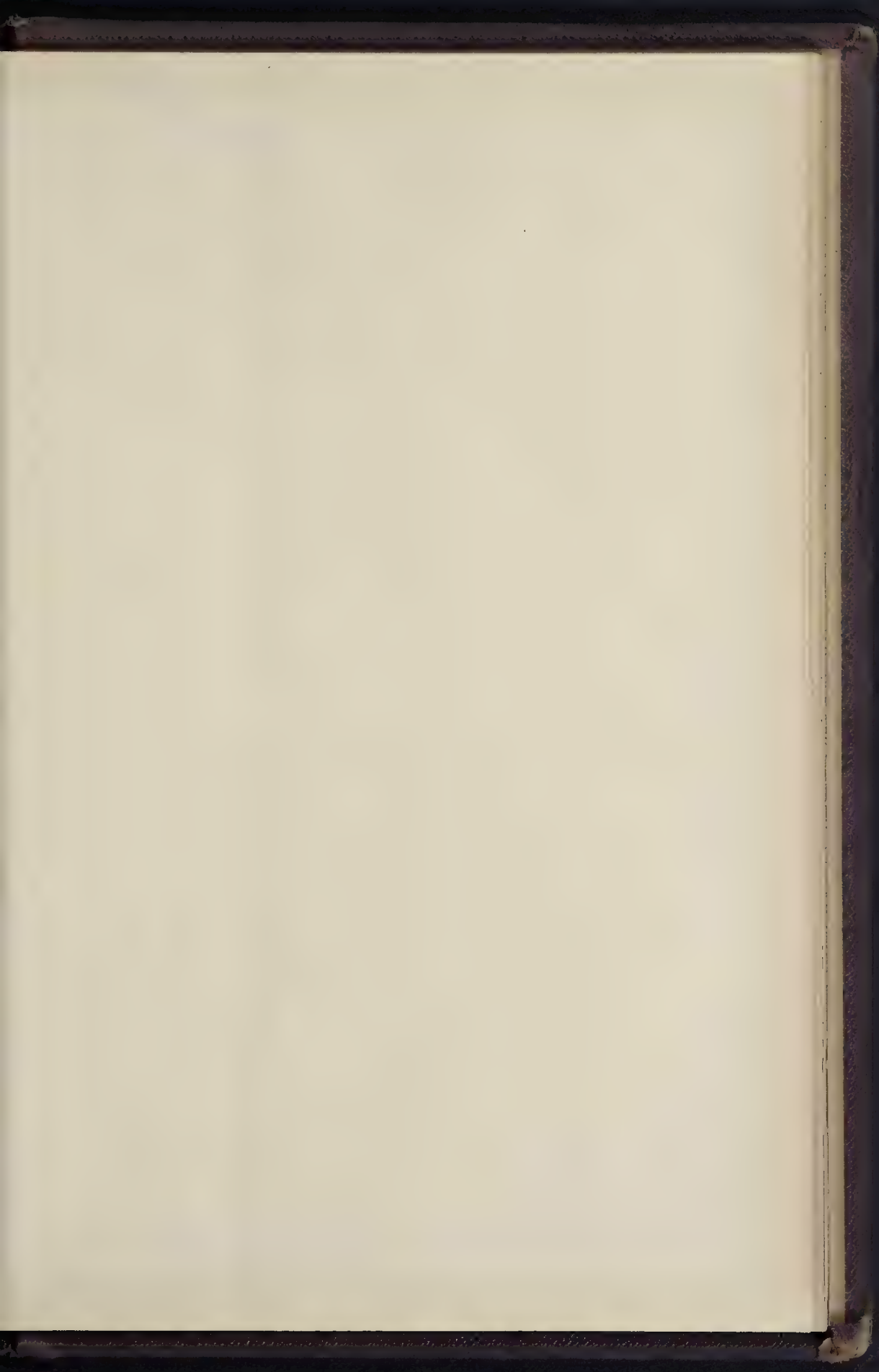


Stephen Poyling
Del.

ELEVATION • TOWAR

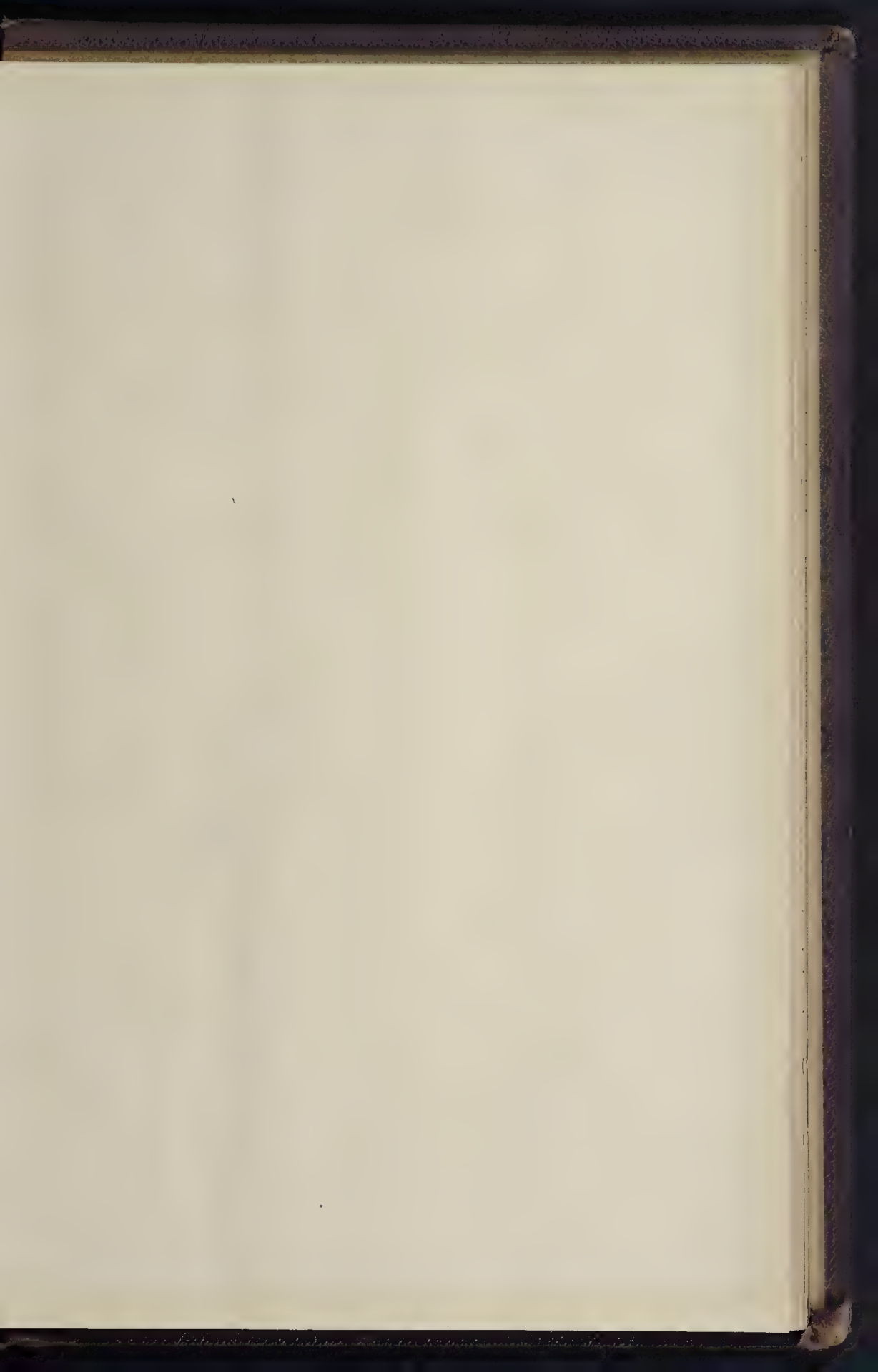






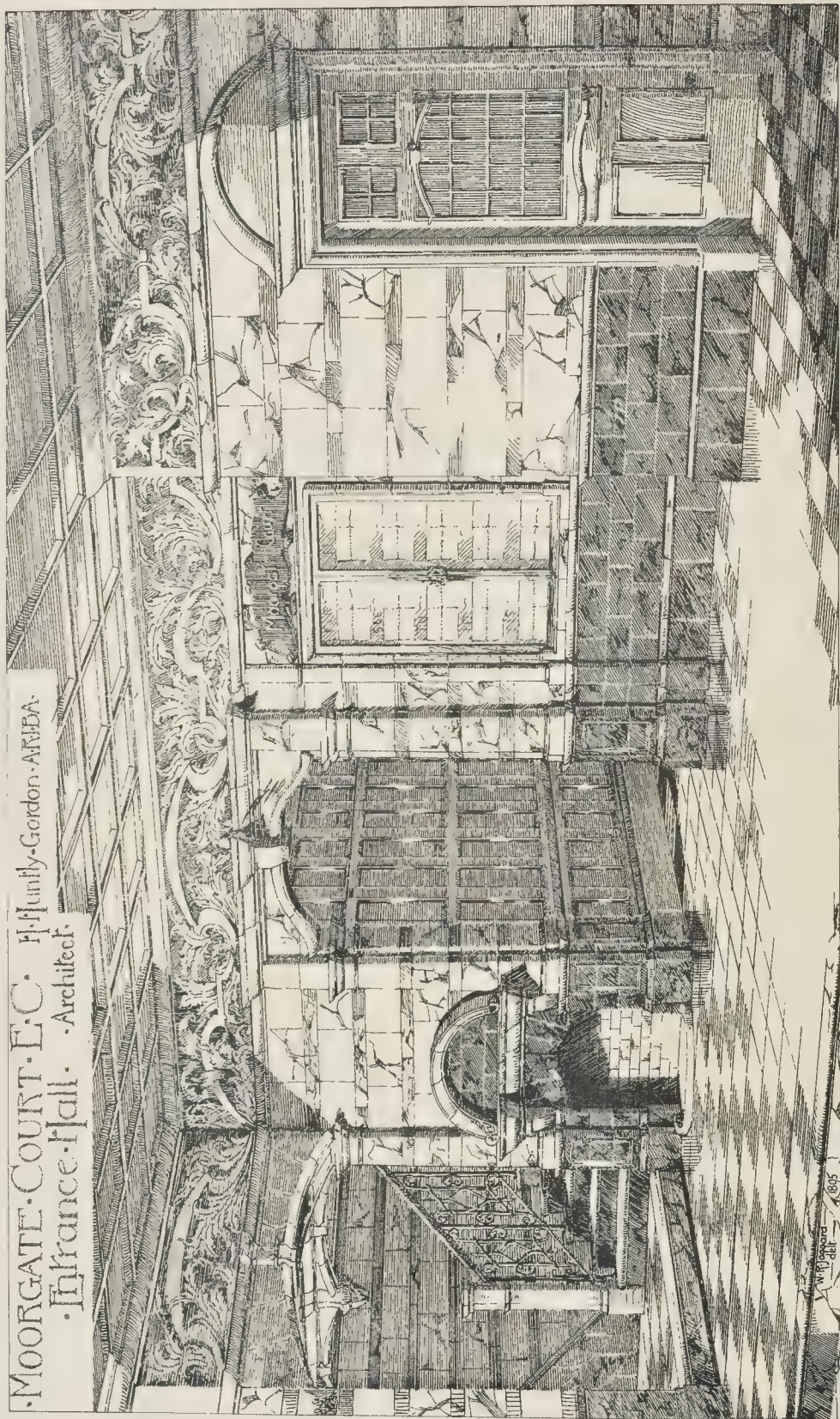
THE BUILDER JUNE 22, 1895.





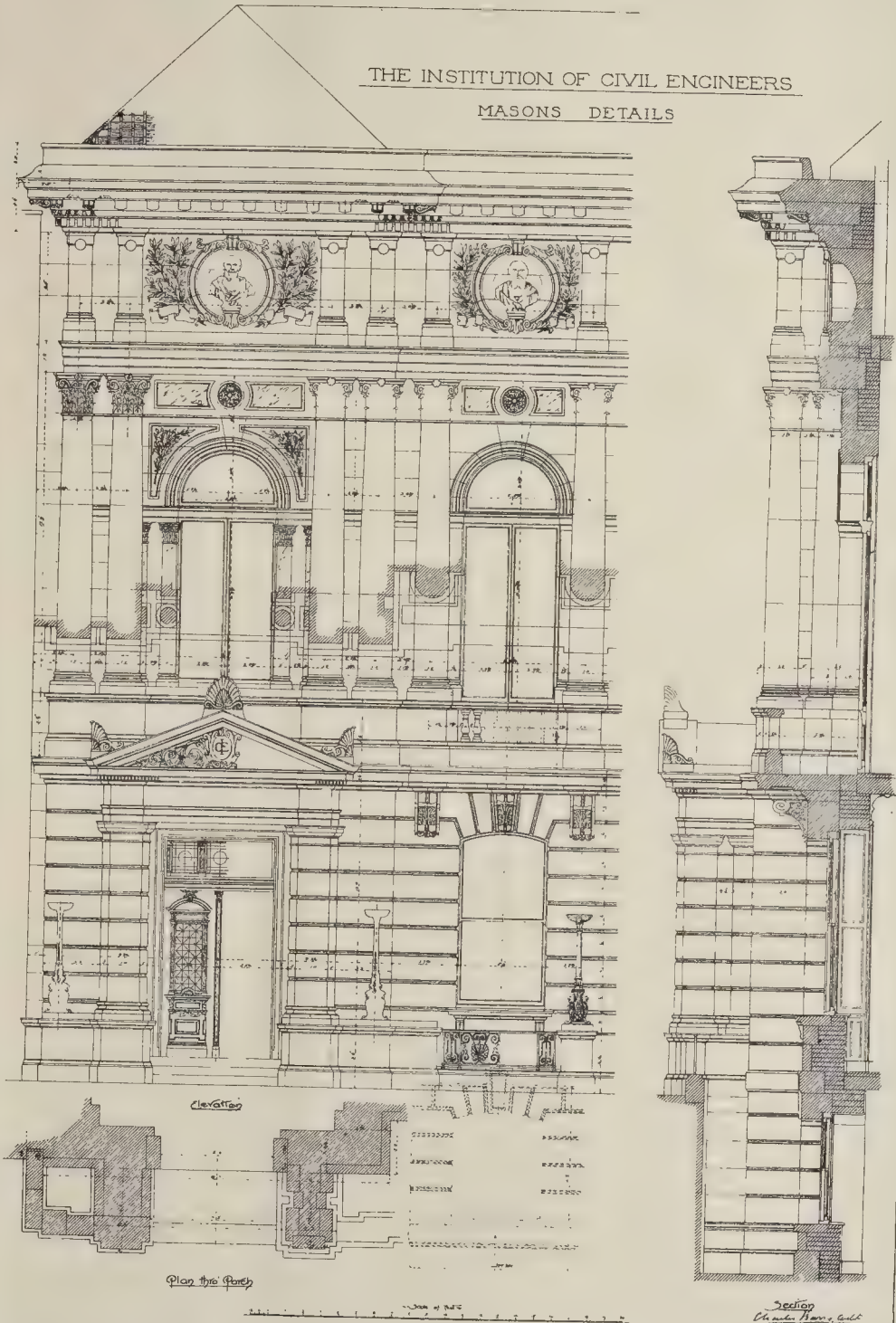
THE BUILDER, JUNE 22, 1895.

MOORGATE-COURT·E.C. H. J. Lintly-Gordon·AR·BA.
·France-Hall·-Architect.



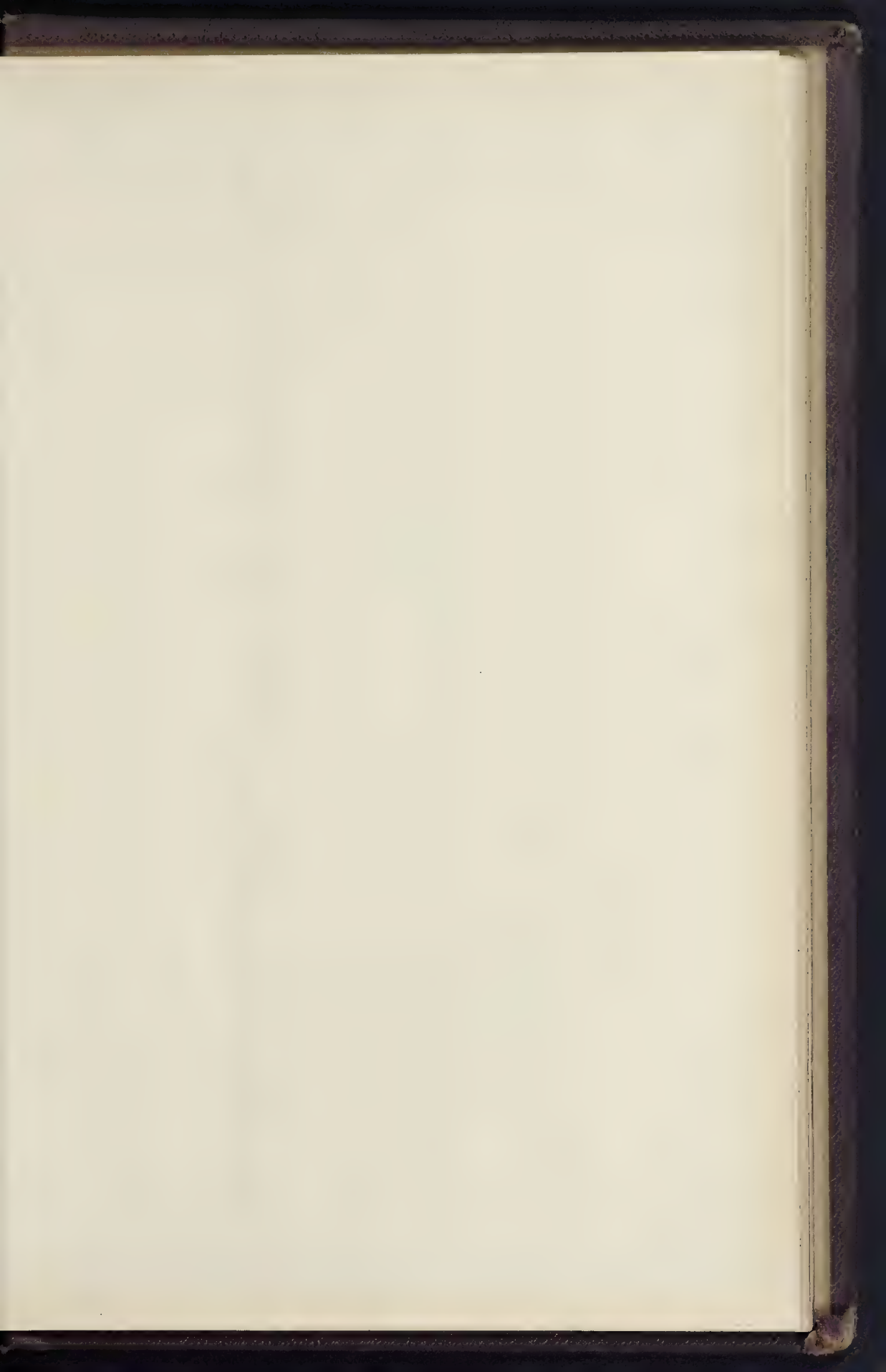
THE INSTITUTION OF CIVIL ENGINEERS

MASONS DETAILS





NORTH SEA AND BALTIC CANAL: THE BRIDGE AT GRÜNENTHAL





THE EAST FRONT OF THE P



ON.—FROM A RECENT PHOTOGRAPH.

the roadway is carried at a level of about half-way between these bearings and the summit of the ribs.

This form of bridge, owing to its effective outline, and also for economical reasons has often been adopted on the continent, but in England there are but few opportunities of employing this type of construction.

A precisely similar bridge, although somewhat larger, was however proposed to be built by Sir Joseph Bazalgette in 1876 across the Thames, near the Tower of London, but the scheme was so strongly opposed owing to the limited head-room which it afforded to vessels passing up and down the river, that it was ultimately decided to abandon the proposal.

The advantages of this class of bridge are, it must be confessed, partly neutralised by the expensive nature of the staging required during their erection.

In addition to the above there are four swing-bridges over the canal, one at Taterpahl, and three near Rendsburg, all of these are operated by hydraulic power.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council, the first after the Whitsuntide recess, was held at the County Hall, Spring Gardens, on Tuesday, Mr. Arthur Arnold, Chairman, presiding.

New Street from Holborn to the Strand.—The Improvements Committee presented an adjourned report in reference to the formation of a new street from Holborn to the Strand. They recommended—

"That the Improvements Committee be instructed to prepare a scheme for the formation of a new street from Holborn to the Strand, subject to the condition that part of the cost of the improvement shall be dealt with on the basis of the compromise arrived at in connection with the betterment clauses of the Tower Bridge (Southern Approach) Bill."

Colonel Ford proposed as an amendment—

"That the Council, whilst not expressing any opinion as to the priority to be given to any particular improvement, authorises the Improvements Committee to inquire in what parts of London and in which directions improvements in communication are most urgently required for the accommodation of the metropolitan traffic, to estimate and report the approximate amount of the annual burden which each scheme would throw upon the ratepayers, and to consider under what financial conditions in each case the improvement could equitably be undertaken."

Mr. E. R. Turtton seconded the amendment, which, after considerable discussion, was lost on a show of hands. In the division which followed there voted for the amendment, 51; against, 64.

The recommendation of the Committee was then agreed to, with the addition of the following words, "and that the Committee be instructed, when submitting their scheme to the Council, to present also the estimated recoupment likely to accrue under the 'betterment' clauses."

A Kentish Town Improvement.—The Improvement Committee stated that they had to report that the improvement of Fortess-road, Kentish Town, had been completed, and that they had formally handed over the charge of the widened thoroughfare to the vestry of St. Pancras. The width of Fortess-road had been increased from 33 ft. to 60 ft. at the point where Fortess-road and Highgate-road entered Kentish Town-road. Parliamentary powers for the improvement were obtained in 1891. Three-fourths of the cost of the work was to be paid by the Council, and one-fourth by the Vestry of St. Pancras.

Mr. Wetenhall proposed that the report be not received. He said that the street was in a really dangerous condition, and it had the appearance of having been laid for years, the stones being loose in many parts. If the matter were referred back for the Engineer of the Council and the Engineer of the parish to confer together some amicable arrangement might be arrived at; otherwise he was afraid the affair would end in some sort of litigation.

Mr. Idris seconded the amendment, which, however, was negatived, and the report was agreed to.

THE WATER BILLS.—Mr. McKinnon Wood brought up the report of the Parliamentary Committee, which described the proceedings of the House of Commons Select Committee on the Lambeth Water (Transfer) Bill on the 14th inst., and added:

The Committee have now adjourned the consideration of the Bills until Tuesday, when the case of the opponents in opposition to the preamble of the Bills

will be commenced. It will be necessary for us, in the event of the preamble passing, to be prepared with some suggestion in the form of a clause or Bill; but we are not prepared to commit the Council to any such clause without further instructions, doubting how far our authority justifies us in so doing. We have therefore determined to report the position for the information of the Council, with a view to its giving us such further instructions in the matter as it may think fit. We recommend: "That we be authorised to draft an alternative clause in substantial agreement with Clause 6, but following so far as may be possible consistently therewith the indications of the Chairman of the House of Commons Committee."

Mr. Benn, M.P. (Vice-Chairman), moved that all words after "alternative clause" in the recommendation should be omitted.

Dr. White seconded the amendment, and suggested that the following words should be added after "alternative clause": "To be submitted for the Council's approval."

This was agreed to, and the recommendation of the Committee, as amended, was adopted.

Having transacted other business, the Council adjourned.

ARCHITECTURAL SOCIETIES.

SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.—The members of this Society had their first excursion on Saturday, June 15, to Hardwick Hall. Among those present were Mr. C. Hadfield (President), Mr. C. J. Innocent (Hon. Sec.), Mr. T. H. Waterhouse, J.P., Messrs. E. M. Gibbs, F. Ward, R. F. Drury, Webster, Smith, Winder, Lockwood, Hemsoll, Gibson, Cook, Mitchell-Withers, Longden, Benton, Norton, Wigfill, and many others. Mr. Benjamin Bagshaw, the Deputy-Coroner, who is a lay member of the Society, conducted the party over the house and grounds. He has spent much time in recent years in investigating the records and accounts in the house, and he gave most interesting explanations of the muniments, which were produced for inspection. The large number of historical portraits which the hall contains, the vast quantity of exceptionally valuable tapestry, unique furniture, and art objects, as well as the decorations and the building itself, were all examined. The old hall also came in for a considerable share of attention. Portions of the house, not shown to the ordinary visitor, as well as the private gardens, were open to the party, and a photograph of the group was taken on the lawn. At tea at the Hardwick Inn cordial votes of thanks were passed to the owner, the Duke of Devonshire, for permitting the visit; to Mr. Bagshaw, for his descriptive lecture; and to Mr. C. J. Innocent, Hon. Sec., for the admirable arrangements.

NORTHERN ARCHITECTURAL ASSOCIATION.—An outdoor meeting of the members of the Northern Architectural Association was held on the 15th inst. for the purpose of visiting the new tennis-court erected by Captain Sir Andrew Noble within the grounds of Jesmond Dene House, from the designs of Mr. F. W. Rich, architect, who conducted the party over the building. He mentioned that tennis-courts of this description were not at all common, only thirty-three being known to exist in the United Kingdom. Among the oldest of these is that at Hampton Court, another being at Lord Salisbury's seat at Hatfield. Sir Andrew Noble's tennis-court has been built by Messrs. Leslie & Co., of London, who have also constructed other modern courts. Sussex bricks have been used throughout the building, which covers an area of about 800 square yards, including the bath and dressing-rooms and marker's residence. Subsequently the party proceeded to inspect the reception-room at Jesmond Dene House. This mansion, the nucleus of which was originally built in 1822, has, during the last quarter of a century, been amplified by Sir Andrew Noble—Mr. R. Norman Shaw, R.A., and Mr. F. W. Rich acting as his architects. A vote of thanks to Sir Andrew Noble, and another to Mr. Rich for conducting the party, concluded the proceedings.

THE SANITARY INSTITUTE.—At an examination for Inspectors of Nuisances, held at Leicester on June 14 and 15, the following twelve candidates were certified, as regards their sanitary knowledge, competent to discharge the duties of Inspectors of Nuisances:—S. H. Andrews, Leicester; F. E. Cox, Brighton; H. J. Guitin, Sheffield; W. M. Hibberd, Southampton; W. T. Howe, Hincley; E. G. King, Rotherham; Margaret Lock, Streatham; E. Richards, London; C. C. Smith, Leamington; S. Spencer, Wolverhampton; J. Turtton, West Bromwich; C. R. Walsh, Darwin.

Books.

Building Construction: Advanced and Honours Courses. By CHARLES F. MITCHELL. London: B. T. Batsford, 1895.

THE success which has attended the publication of the elementary course by Mr. Mitchell on this subject has justified the appearance of the present volume, and we are pleased to note that the same thoroughness which made the success of the former is to be found in the latter. Within the limits of the size adopted it is difficult to imagine a more judicious selection of valuable information and instruction in building construction than this work presents. A concise account of materials is given, and in addition to the usual purely constructive work, space is found for a lucid explanation of graphic statics and for some account of the guiding principles of sanitation. As the work appears primarily intended for the use of candidates preparing for the examinations of the Science and Art Department, an appendix is included, giving specimens of past examination-papers. We are inclined to question the wisdom of this, as the forty pages thus occupied might be better employed in amplifying some of the more important chapters. The full use of figured dimensions in the illustrations is a good feature which has been followed here as in the former volume, and adds to the value of the work for students. The two parts together should be in the hands of every architect's pupil, and will be found excellent value for the small price.

A Handy Book on the Law Concerning Owner, Builder, and Architect. By JAMES WALTER SMITH, Barrister. London: Eppingham Wilson & Co. 1895.

MR. J. W. SMITH has had more experience in the compilation of legal handbooks than any other living lawyer: the number which he has written is considerable, and it is therefore not surprising that the work before us is very well done. It is completely free from legal technicalities, but throughout it gives legal advice in plain English. There is really no more to be said. But, by way of illustration, we may cite what Mr. Smith says upon the vexed question of advertisements for architects' designs: "Again, if nothing is said in the advertisement to the effect that the author of the best design is to be employed as architect in the superintendence of the building, the mere fact of his being the successful competitor does not entitle him to be employed in the superintendence, even if his design is used. The advertiser has only asked for plans, &c., and must pay the rewards which he has offered, but he is not bound to do more. It will be useless to talk about the 'custom,' 'understanding,' 'invariable practice,' &c., of architects, for two reasons: one, that the advertiser is not an architect, and the other that there is a written contract. It may be disappointing, it may be insulting: but a rival may be employed for the more remunerative part of the work" (p. 21). This is plain and clear; there is no mincing of matters, and no legal phraseology; he who runs may read; but having read it no architect of prudence and self-respect will send in designs for a building, unless it is stated in the advertisement that the successful competitor shall be the architect for the building.

The London Building Act. A Text-book for the use of Architects, Surveyors, Builders, &c. Containing the Act printed in *extenso*, with a full Abstract, &c., &c. By BANISTER FLETCHER, Professor of Architecture and Building Construction, King's College, London. London: B. T. Batsford, 1895.

THIS book contains the full text of the London Building Act, along with additions in the way of comments, an abstract, and illustrations. The text portion of the Act is printed in good clear type, and the abstract of the portion of the Act relating to building is very useful as a finger-post to the sections in which the detailed regulations in regard to various operations of building are to be looked for—an assistance the more desirable from the fact that the Act is by no means well or systematically arranged.

The coloured sections of walls, showing thicknesses for different heights and lengths, may assist some people in realising the precise effect of the provisions more easily than would otherwise be the case, but we do not know that putting the heights and thicknesses into schedule form is not just as ready a way of simplifying the matter

as the coloured sections. One or the other addition was no doubt wanted, in consideration of the unwieldy manner in which the requirements for walls are written out at full length in the Act. There should have been a statement on these and other diagrams as to the scale they were drawn to, besides the figuring. The general introduction draws attention to some of the special points in which the Act alters the conditions of building in London. The reason given for the occasional discrepancy between the legal and geometrical centre of a road is no doubt the right one. Some of the other and more surprising confusions of language and definition in the Act the author does not attempt to explain, perhaps because it is hopeless.

The London Building Act, 1894, with Appendices containing Statutes other than the Building Act, still in force and affecting Building Operations, &c., &c. By WILLIAM R. GRIFFITHS, LL.B., and F. W. PEMBER, M.A. London: W. Clowes & Sons. 1895.

THIS may be considered the lawyer's book on the London Building Act, as the one mentioned above is the architect's and builder's book. The 1894 Building Act is very well treated, each of the sections being accompanied by comments in small type giving references to previous legislation, indicating what the alterations have been, and giving explanations as to the actual bearing and meaning of some of the more complicated paragraphs of the Act. The book contains also reprints of the Metropolis Management Act, 1855; the London County Council General Powers Act, 1890; the Factory and Workshops Act, 1891; the Public Health (London) Act, 1891; and the various collections of by-laws in force in regard to different classes of structures and operations. The book is well indexed, and contains, besides the general index, two tables of page references, one to cases cited, the other to statutes quoted or referred to. Altogether it is a very complete and useful handbook to the subject of building law in reference to London.

The London Building Act, 1894. By A. J. DAVID, B.A., LL.M., Barrister-at-Law. London: Crosby Lockwood & Son. 1894.

THIS is little more than a reprint of the London Building Act, 1894, with an index, and some brief notes to some of the sections, referring to the original form of some of the provisions in previous Acts, or to other clauses in the present Act which may be looked at in connexion with them. Occasionally a cautionary note is added as to the manner in which a section is to be interpreted. The book has the advantage of being conveniently small and compact.

TRADE CATALOGUES, &c.

MESSRS. DOULTON & Co. send us a new and large illustrated catalogue of their sanitary appliances, including water-closets, urinals, baths, sinks, lavatory basins, &c. We are glad to see that the majority of the water-closet basins show sections with a deep standing water-charge in the basin; the shallow basins, though they enable the flush of water to be somewhat economised, have been found wanting, and the apparent saving of water is only at the cost of insufficiently cleansing the trap. The bath and lavatory department of the catalogue shows an immense variety of designs and contrivances, among them some special arrangements for schools and for asylums and hospitals which are worth attention. The "Lambeth Instantaneous Water-heater" provides automatically for preventing the gas being turned up except when there is water in the pipes, and turns it down when the flow of water is cut off, so as to prevent any chance of the heater being burned out. There are plenty of designs for wooden bath enclosures, things that every house is better without, but we presume people will have them. As to the decoration of the baths made to be erected without casings, we wish that the artistic taste which presides over the productions of "Doulton ware" were brought to bear on the bath and lavatory decorations, which are not better in this respect than most others. There is a large variety of flushing-tanks, among them a useful small circular automatic flushing-tank, either in stoneware or in cast-iron coated with the Angus Smith solution, which are specially intended for fixing underground to flush short lengths of drain. There is also an ingenious combined automatic flush-tank and grease interceptor so contrived that the water is flushed away without

the grease, the fact of the grease floating on the top being utilised to control it. Manhole covers, sinks, gully gratings, &c., are also included in the catalogue, and also decorative tilings for hearths and walls. These are superior, in a decorative sense, to the bath designs, because they do not attempt too much. The fault in these matters, however, lies very much with the public, who mostly prefer showy things.—Messrs. Morrison Ingram & Co. send us a large illustrated catalogue of sanitary fittings, containing a great deal of good work. Among special arrangements illustrated, a good one where space is limited is that of the combined bath and lavatory, the lavatory basin being mounted over the small end of the bath, so that the feet of the user of the bath can go under it, the basin facing to the side of the bath for separate use; one supply of hot and cold water serves both bath and basin; a saving in plumbing. The porcelain baths, with steamless fittings, are very good articles, and all the better for being left plain or with a little very simple decoration. The wood-cased bath, page 83, is very neatly finished; in some other parts of the catalogue we find, as usual, a great deal of elaboration of ornamental work, especially cast-iron supporters and standards, which would be much better omitted. Manufacturers who wish to recommend their illustrated catalogues in the eyes of architects will do so much better by showing plain well-executed practical work than all this ornament, which is seldom or never well designed. On page 159, for instance, is a plain cast-iron bracket for a closet-cistern (No. 118) which is perfectly satisfactory; opposite to it (No. 119) is an "ornamental" one, which is utterly bad, an attempt to design by someone who does not know what design means. Why spoil an illustrated catalogue by putting this kind of gimcrack into it? We do not go to trade catalogues for art, but for practical work. The catalogue includes a large selection of plumbers' brass-work, tops for baths, &c. The combined spray and reclining bath is a convenient and inexpensive arrangement, with no erection above the bath except the stand-pipes for spray and shower and a curtain which is intended to hang down inside the bath (when the spray is used) and prevent water getting to the floor.—Messrs. Farrar & Co. send us a catalogue of their work in metal casement windows, drawing special attention to their sloping sill with water drainage holes. A new form of casement for opening inwards when required is noticed in another column.—Mr. Geo. Wragge's Supplementary Catalogue of metal casements and opening gear shows among other things a section with the inner bar of the sill slotted and bevelled to catch and conduct away condensed water from the inside of the window. A double metal casement opening outwards in pairs and with no centre-bar is also shown. Some of the metal-work design for casement fittings and hinges is very satisfactory in style.—The Leeds Fire-clay Co. send brief particulars of the goods to be seen at their new branch house in Manchester.—Messrs. T. Walker & Co., of West Hartlepool, send a book of photographs of the different departments of their large saw mills and timber stores, showing the rooms in which various processes of manipulating timber are carried out; also photographs of various interiors filled with roofing, wainscoting and other work carried out at their mills.—Messrs. E. H. Shorland & Brother send us their illustrated catalogue of their three principal classes of stoves, as well as other articles manufactured by them. The "Manchester" grates and stoves are made so as to combine ventilation with warming, with flues for the supply of cold air, and warm air delivery through the upper part of the grate or through the top of the stove; the stoves are also made with descending flues where desired, so as to get rid of the unsightly stove chimney. Another type is made with a fire-tile back projecting forward over the grate to reflect the heat into the room. Many of these grates, as illustrated here, have also the merit of being good and satisfactory in appearance. Drawings are given showing the arrangement of flues for inlet of warmed fresh air into the room.—Messrs. Baird, Thompson, & Co. send us a catalogue of chimney-cowls and ventilators, without any mechanical means, we have no great opinion; they may act when wind is blowing, it is obvious that they cannot act when the air is still, which is when they are most wanted. Chimney-cowls to prevent wind blowing down the chimney come under another category, and those contrived by Messrs. Baird, Thompson, & Co. seem likely to effect their object.—Messrs. J. H. Patterson & Co. send a

book containing a collection of photographs from works in marble carried out by them; the designs, we presume, are those of the architects whose names accompany the illustrations, but the photographs give the impression that the work has in all cases been very well carried out.—Messrs. Bolding & Sons send us an illustration of their "self-cleaning" iron tanks for drinking-water, provided with a circular flushing pipe running round the rim of the circular tank, by which the whole interior can be cleaned and dirt and sediment washed away.—Mr. F. W. Barker sends a sheet of illustrations of his radiators for warming and ventilating.

Correspondence.

To the Editor of THE BUILDER.

GROUND GLASS AS A BUILDERS' MATERIAL.

SIR,—Owing to a difficulty recently experienced in getting rid of broken black glass, which at the present time in London has no market value, it occurred to me that it might, if crushed or ground, be used as builders' sand, and would, in some circumstances, be an even more useful material.

Accordingly, I accepted an offer of Mr. Carter, of Mark-lane, to grind a small quantity by means of his patent machine, and I shall be glad to show any of your readers who may be interested in the subject a sample of the product. The cost of grinding is very small, and there is a large quantity of black and other glass to be obtained in London for the cost of cartage. It should therefore be worth the while of some enterprising builder who has steam-power at his disposal to make the experiment for himself. I can give him fifty tons of glass to begin on.

I enclose a small sample for your inspection.

F. S. PLOWRIGHT.

37, Oval-road, Camden Town.

See our Note on page 465.

INSURANCE OF CEMENT WORKS.

SIR,—As the action of the insurance companies in giving notice of enormous advances in premiums chargeable upon cement works is a matter of serious import to cement manufacturers now that the trade is suffering from depression and foreign competition, perhaps you will allow me to suggest that the leading manufacturers should call the trade together and endeavour to form an association for mutual insurance.

WM. J. KEMP,

Managing Director,

Sub-Wealden Gypsum Co., Ltd.

The Student's Column.

BRICKS AND TERRA-COTTA.—XXV.

LOCAL DEVELOPMENT OF BRICK-EARTHS
(continued).

Wealden District.

IN briefly alluding to the various brick-eartths in the Wealden district we shall say a few words also respecting contiguous areas that do not, properly speaking, fall within the Weald as generally understood. The Wealden formation contains several distinct beds of clay which are worked for bricks and tiles in Sussex and Kent. One of these, the Wadhurst Clay, consists of alternations of clay, shale and sand-rock, and occasional beds of fossiliferous limestone, of calcareous sandstone, and of clay ironstone. Its total thickness is rarely less than 60 ft. whilst it often attains to 100 ft. The Grinstead Clay closely resembles the Wadhurst; in a brickyard not far from Paddockhurst a red and purple clay is developed in the uppermost part of the series. The Weald Clay itself is almost entirely composed of clay, but gets shaly with depth of working. The shale is generally brown or blue in colour, whilst the clay in addition is often yellow. Occasionally, red and mottled clays put in an appearance. In the neighbourhood of Leith Hill it is estimated that the Weald Clay alone is between 900 and 1,000 ft. in thickness. The largest brickyards in the district, however, are along the banks of the Medway, and the materials employed are Gault Clay, and the old alluvium of the river, especially in the vicinity of Maidstone. The Gault is very uniform in character, even when traced over a wide area; it consists essentially of stiff blue clay, almost black in some localities. The section at the great brickyard at Aylesford is thus given by the late Mr. Wm. Topley.*

* "Geology of the Weald" ("Mem. Geol. Surv."), 1875, p. 153.

Brickyard Section.—Ayleford.

Thin, irregular capping of gravel.

Chalk Marl, whitish, breaking up into small pieces (by weathering), with small dark grains here and there, and also masses of stone; 12 to 15 ft., passing into—

Greenish grey marly sand, with dark grains, small irregularly-shaped dark phosphatic nodules, and "race." Upper Greensand, 18 in. in thickness.

Gault Clay; the uppermost 3 ft. or so light-coloured and marly; the remainder being bluish-grey to a great depth.

The well-known Burham brick-pit yielded a somewhat similar section. In the smaller brickyards, sand is generally mixed with the Gault Clay in the manufacture of bricks, the clay alone being too stiff; a certain amount of calcareous matter is also frequently added. The product is the celebrated "gault bricks"; but it may be noted that many kinds known in the market as "gault bricks" are not made from Gault Clay, though they may be none the worse for that. The divers river alluvia, as before mentioned, furnish an excellent brick-earth in many localities in the district, and the bricks made therefrom are also sometimes known as "gault bricks." Sittingbourne, as everyone is aware, is a celebrated brick-making district, the superficial deposits in that area yielding good brick-earth. The Thanet Sands in the neighbourhood are often very argillaceous, and have been employed also in the manufacture of clay goods suitable for the London market.

Dorset District.

The most important areas in Dorsetshire are those in the "Isle" of Purbeck and at Poole, so largely used in the manufacture of superior ware; but as we have previously alluded to them somewhat in detail in another connexion it is hardly necessary for us now to do more than to remind the student that they consist chiefly of white clay, almost pure kaolin in some beds, and that they are of middle Eocene age. The wash, or alluvium, derived from them, also makes good earth for pottery purposes. The Great Oolite Series, and especially the Fullers' Earth clay, has been used for brickmaking and burnt for ballast for many years in the neighbourhood of Bridport, at Powerstock, Crewkerne, and Bradford Abbas. At High Cross Hill, between Haselbury and East Chinnock, red and mottled or yellowish tiles, drain-pipes, and bricks are manufactured. Mr. H. B. Woodward remarks* that bricks, drain-pipes, and coarse earthenware were formerly made from the Fullers' Earth clay west of Newbury, north of Mells, in Somersetshire, but that the bricks were of inferior quality. The clay is usually calcareous, and often contains nodules of "race." In Gloucestershire, he states, it is generally too calcareous to be of service in brickmaking, though clays belonging to the Forest Marble series have, in some places, been worked for that purpose at Siddington, near Cirencester, Badminton, and Blackthorn, near Bicester.

Fenland District.

The argillaceous beds forming part of the Fen Silt in Cambridgeshire, Lincolnshire, &c., vary in colour from light to dark blue and purple, but are often mottled. The clay is generally tolerably free from sand, and is what brickmakers call "light" clay. It shrinks considerably on firing, so is always mixed with sand or warp, but even then it behaves very erratically. The following table, compiled from information contained in Mr. S. B. J. Skerchley's memoir on the area, is exceedingly useful in that connexion:—

Shrinkage of Fen Brick-earths.

Locality of Brickyard.	Size of Mould.	Size of burnt brick.	Shrinkage, percent.
	Inches.	Inches.	
Wyberton, near Kirton	10 to 12 long.	9 long.	14.3
Boston East Brickyard	10 by 5 by 3	8½ by 4½ by 2½	27.7
Cow Bridge, Boston.	10 by 5 by 3	9 by 4½ by 3	25.2
Howbridge Drain.	10 by 4½ by 3	9 by 3 by 3	37.2
Heckington, Star Fen.	10 by 4½ by 3	8½ by 4 by 2½	36.3
Holbeach (Gilder's).	10 by 5½ by 3	8½ by 4½ by 2½	36.2
Wisbech (Andrews).	10½ by 5½ by 3	9½ by 4½ by 2½	34.6
Walsoken	10 by 5 by 3	9 by 4½ by 2½	43.4
	10 by 5 by 3	9½ by 3½ by 2½	43.1

From the above it will naturally be suspected that the bricks made from the Fen silt are not of good quality as a rule. Most of them are very poor, being soft, friable, and often ill-shaped and

cracked. They are generally burnt in kilns, but frequently, when farm buildings are about to be erected, the clay is dug on the spot, and the bricks are then fired in clamps. Apart from its behaviour in the kiln, this clay, Mr. Skerchley says, often contains carbonaceous markings and fragments of wood, and occasionally drifted trunks of trees. When wood is plentiful the bright blue phosphate of iron occurs in amorphous earthy lumps and streaks. Stones are exceedingly rare in it, and it is seldom stratified, but generally breaks up into rounded lumps with a glistening surface. The Boulder Clay of the Fenland, which underlies the silty clay just described, is also drawn upon for brickmaking, especially in the vicinity of Boston, where there are many brickworks in this dark blue earth.

Stamford, &c., District.

The clays of the Oolitic series are largely dug for bricks and pottery in the neighbourhood of Stamford, in Lincolnshire. The Lower Estuarine beds have been worked also for terra-cotta clays. Professor Judd notes* the following section:—

Section at Terra-Cotta Works, Stamford.

Rubby Oolite (in patches).
Brown sand (irregular in thickness).
"Terra-cotta clay," sandy, and of a light blue colour, very irregular in thickness, 1 ft. to 4 ft.
Ironstone rock, 8 ft. to 13 ft.

Upper Lias clay.

An analysis of the "terra-cotta clay" shows that it is composed of almost pure silicate of alumina, with a little free sand in very fine grains; sandy lumps also occur in the mass, and these are ground up with the clay in the mill. This admixture of the clay with fine sand is said to greatly improve its quality. Mixed with a very small quantity of the white clay from Dorsetshire, these clays from the Lower Estuarine Series make an excellent terra-cotta, of a cream colour, and very durable. The well-known Stamford terra-cotta, manufactured by Mr. Blashfield, was made of it.

The Upper Estuarine Series in the same district consists chiefly of clays, occasionally very sandy, of various colours, with bands of sandy stone interstratified with them. Beds full of small calcareous concretions and bands of fibrous carbonate of lime also frequently occur, and in its lower part this series consists usually of white clays passing into sands. The thickness of the whole probably does not exceed 30 ft. Prof. Judd remarks (*Op. cit.*, p. 189), that the clays in this division of the Great Oolite are admirably adapted for brickmaking, for which purpose they are dug in the vicinity of Stamford, Great Oakley, Water Newton, Wood Newton, between Stanton and Brigstock, and between Pilton and Luffenham. At Walkerley a good fire-clay occurs, and at Little Bytham the lower part of the series has been worked for many years for clays, which produce bricks of singular hardness and durability. From the ringing sound which they give when struck together they have been called "clinker bricks." We quote the following section to show the extreme variability of the clays exploited:—

Brickyard Section.—Little Bytham.

Soil, 6 in.; tea-green clays, 1 ft. 2 in.; brown, sandy clay, 1 ft.; greenish clay, full of soft, white carbonate of lime, 1 ft.; variegated blue and brown sandy clay, 1 ft. 6 in.; blue clay, 6 in.; blue and brown sandy clay, 1 ft. 6 in.; bed of indurated sand with fossils, 6 in.; blue clay, slightly mottled, 4 in.; brown and blue mottled stiff clay with lumps of soft carbonate of lime, 4 in.; tea-green clay, ferruginous at base, 1 ft.; dull greenish clay, 1 ft.; lighter coloured green clay, with seams of comminuted shells and

clay, with ferruginous markings, 1 ft. 2 in.; greenish and dark blue clays, 1 ft. 9 in.; dark blue compact clay, 5 ft. 2 in.; brown ferruginous clay, 5 ft. 2 in.

The student can easily imagine that considerable skill is required in handling deposits so variable as these, in order that an uniform brick shall be produced; but it should not be forgotten that such a combination of different earths is rarely met with. From the estuarine character of the deposits the divers beds must be continually changing lithologically, and we should not be surprised to learn that by working into the face even for a few months, the nature of each division is not to be depended upon. At the same time, in spite of the thinning out of a bed here, the thickening of another there, and the development of "race" in clays sporadically, the aggregate, when thoroughly mixed and incorporated, does not usually, in such sections, materially vary even in the course of years of working. It may seem paradoxical to say so, but the aggregate of ever-changing beds is not usually as variable as that of a thick and tolerably homogeneous and persistent deposit of clay. A certain amount of compensation may be observed in the former, but if the latter varies at all it generally varies altogether, without compensatory elements being present.

Huntingdon District.

The clays of Huntingdonshire are also much used in brickmaking. The supply is chiefly drawn from the Oxford and Kimeridge Clays, the Gault, and, to a small extent, from superficial brick-earths. The largest brick-manufacturing centre is St. Ives. The thickness of the Oxford Clay in the district is estimated at 700 ft., and as is usual in a marine clay it is fairly homogeneous in tint and appearance throughout, though much laminated in places. It is of a grey or bluish-grey tint, selenite (hydrous sulphate of lime), and in every case where any considerable thickness is shown, layers of limestone, or of septaria occur. These layers are seldom more than 1 ft. in thickness, but they are found at intervals of a few feet only, and are tolerably persistent over considerable distances. An enormous amount of this clay has been dug at Fenton, one mile north-west of Piddley; one section gave 16 ft. of bluish-grey clay, with crystals of selenite; another, 8 ft. of grey clay, with a hard sandy bed 6 in. in thickness in places. A large brickyard west of St. Ives yielded the following, measured in various places to get the full section:—

Brickyard Section.—St. Ives, Hunts.

Grey clay; fine purple calcareous sandstone; fine yellow ditto; blue clay; two thin beds of sandy limestone, with a parting of clay between them; blue clay; sandy limestone.

This section is much more variable in character than the Oxford Clay usually is. Brickyards in this formation also occur at Boxworth, Long Stanton, and elsewhere.

The Kimeridge Clay in the area is dark blue, somewhat shaly, and contains much selenite. The principal working in it is at Knapwell, where the section shows about 15 ft. of pyritiferous clays.

The Gault yields a good brick clay, rather stiff, which has been and is much employed in various parts of Cambridgeshire for making bricks, drain-pipes, and tiles. The bricks (with which we are more immediately concerned) do not present a very pleasing appearance, but are hard and durable.

As examples of the chemical composition of the class of clays just referred to, the following particulars may be given*, though they do not, strictly speaking, relate to the district under consideration:—

Chemical Composition of Kimeridge and Oxford Clays.

	Oxford Clay.	Kimeridge Clay.
Protoxide of iron.....	1.78 per cent.	2.68 per cent.
Sesquioxide of iron.....	3.75 "	4.12 "
Bisulphide of iron.....	1.70 "	1.74 "
Sulphate of lime.....	1.37 "	5.14 "
Carbonate of lime.....	—	4.22 "

The Oxford Clay is from brick-works at Chippenham, in the north of Wiltshire; and the Kimeridge from near Calne, in the same county, employed for coarse pottery and bricks. It may be noted that crystals of selenite were distributed throughout these clays, and that the analyses were directed principally to ascertain the nature of what might be termed the impurities in them. It is not so stated in the accounts quoted,

* "The Jurassic Rocks of Britain," vol. iv. ("Mem. Geol. Surv."), 1894, p. 492.

* "Geology of Rutland," &c. ("Mem. Geol. Surv."), 1875, p. 103.

* "Catalogue of British Pottery and Porcelain in the Museum of Practical Geology," 3rd ed. (1876), pp. 292-3.

but the remainder is evidently intended to represent the pure clay, or hydrous silicate of alumina, the proportions of which may be found by deducting the amount of iron and lime given in each case. From a manufacturing point of view it is very necessary to ascertain the state of the iron and lime as above given; in almost every clay it may be confidently stated that sulphates exist, but they are not often determined; the proportion is generally small, though it is always worth noting.

Devonshire District.

On a previous occasion (*ante*, p. 31) we alluded to the china clays of the West of England; all we now purpose to do is to say a few words respecting the earths from which the well-known fire-bricks and pottery of the neighbourhood of Bovey Tracey are made; also the terra-cotta clays of Watcombe, near Torquay. From the observations of Mr. S. Smith Harvey we learn that in the Bovey district the surface clays are principally used for making a common grey or buff brick, used locally. The white, or potter's clay, is largely used in the manufacture of stoneware pipes and sanitary apparatus, and is especially suitable for this purpose on account of its ready vitrification. The greyer, or fatter clays are used in the manufacture of paving and facing bricks of a more valuable character. The quartzose, sandy clays are made into fire-bricks; they contain from 77 to 80 per cent. of silica, and from 16 to 18 per cent. of alumina, with very small proportions of iron, lime, magnesia, and potash.

The Watcombe Clay is of post-Tertiary age, and is probably derived from the Trias of South Devon. It is a red clay, exceedingly fine and free from impurities, except those which assist in the process of fluxing. It contains about—silica 58, alumina 20.5, peroxide of iron 7.7, lime 1.6, potash 3.8, water, &c., 6.5, small proportions of magnesia and soda, and with traces of peroxide of manganese and phosphoric acid.

SURVEYORSHIP APPOINTMENT.

At the meeting of the Harborne Charity Trustees, last week, Mr. Ralph Heaton, architect and surveyor, of Birmingham, was appointed surveyor to the estates.

GENERAL BUILDING NEWS.

MUNICIPAL BUILDINGS, BATH.—The new municipal buildings at Bath were opened on the 11th inst. As many of our readers are aware, Mr. J. M. Brydon, of London, was the architect, his plans having been selected in competition by Mr. W. Young, who acted as assessor. Illustrations or descriptions of the building will be found in our issues for December 26, 1891; January 9, 1892, and May 28, 1892. Messrs. J. Hayward & E. W. Wooster were the contractors.

NEW WILSON U.P. CHURCH, PERTH.—The memorial-stone has just been laid of the new Wilson U.P. Church, Perth. The style adopted is that of the Italian Renaissance. The lower part of the church front is divided by broad massive piers, the two side recesses containing double windows, which light the vestibules, and the central portion the main entrance-door. This is flanked by two Doric columns supporting a moulded pediment, the doorway having deeply-moulded jambs and a carved transom and lintel. The side piers of front are carried up plainly to the main pediment, and over the central piers are two Ionic columns, between which is a multilioned window with semi-circular head lighting the end gallery. Single windows, with lunettes over them, occupy the side spaces. Over the columns is the main pediment, in the upper part of which is a moulded niche, and an ornamental cross will form the terminal feature. On each side of the central front are placed the staircases, each with exit door, and treated in unison with the central feature, but simpler in detail; while on the half-side the staircase is extended, forming a corridor to the hall-buildings, and also a connecting stair from the church. The hall entrance is marked by an octagonal turret, which contains the staircase, and is carried up in three stages, with a series of circular columns marking the angles and terminating with an ogee roof, which will be covered with copper. The hall-gable has a moulded pediment with three-light windows, and under this plain multilioned windows light the caretaker's house. The side elevations are in similar style to the front. Stone work will be largely used in the interior. The church is divided into nave and side aisles by two stone arches on each side of wide span, springing from main piers which are carried up beyond the arches to the main roof timbers. A similar arch spans the pulpit recess, and smaller arches are at each side over the organ-chambers. The roof is formed in a double cove, all the main timbers being exposed and moulded and filled in with shaped and moulded spandrels. There are side and end galleries which are to be carried on steel girders between the piers. The gallery fronts will be partly

open and carved in outline between the piers. The seating space provides for 900 sittings, of which 500 are on the area floor and 310 in the galleries. In the hall buildings the main hall is placed on the first floor, and will form a room sufficient for a meeting of 400 persons, and the arrangement of staircases allows of its being reached direct from the church gallery, as well as from the church staircases and its own separate access. The ground floor of the hall block is occupied by a session hall, ladies' room, and caretaker's house, and at the rear of the church is the vestry and a kitchen. The building was designed by Mr. John B. Wilson, architect, Glasgow, and the following are the principal contractors:—Mason, Messrs. Fraser & Morton; Wright, Mr. Thomas Forgan; plumber and gasfitter, Messrs. Frew & Sons; slater, Mr. James Buchan; plasterer, Messrs. J. Mackay & Son; painter, Messrs. Stalker & Boyd (all of Perth); and glazier, Messrs. Wm. Meikle & Son, Glasgow. Mr. James Murray is resident clerk of works, and the total cost will be about 9,000l.

THE RESTORATION OF DURHAM CATHEDRAL CHAPTER HOUSE.—On the 13th inst. the restored Chapter House of the Cathedral Church of Durham was formally handed over to the Dean and Chapter by the Earl of Durham. The restored Chapter House forms part of the memorial to the late Bishop of Durham (Dr. Lightfoot). The cost of the restoration has been 5,600l. The Chapter House is on the site of, and of the dimensions of, the Norman Chapter House erected in the twelfth century. As restored, it is an oblong room, with a semi-circular apse at the east end, the length, including the apse, being 77 ft., the breadth 36 ft., and the height, to the crown of the vaulting, 44 ft. On a moulding over the new west doors is carved a Latin inscription from the 121st Psalm. Above the head of the archway is filled in with tracery, and has a standing figure of an angel in the centre holding a shield charged with the arms of Bishop Lightfoot, impaling those of the diocese. Another inscription is in raised letters on the stone head of the small doorway leading through the ante-room into the south transept of the Cathedral. The works have been carried out from the designs and under the superintendence of Mr. C. Hodgson Fowler, F.S.A., Cathedral architect.

TOWN HALL, CLERKENWELL.—The new town-hall erected by the vestry of St. James and St. John, Clerkenwell, was opened on the 14th inst. by Lord Rosebery. It has been built by Messrs. C. Deuring & Sons, from the designs of Mr. C. Evans-Vaughan. The principal entrance is in Rosebery-avenue, and gives access to a vestibule whence corridors lead to the offices of the vestry clerk, surveyor, medical officers, &c., and to committee-rooms. The first-floor is taken up by the council chamber and the public hall. The former is a room 51 ft. long by 30 ft. wide, and has at one end a public gallery. The public hall is 66 ft. long by 42 ft. wide, and will seat 500 people. The marble mosaic pavements have been supplied and fixed by Messrs. Webb & Co., Euston-road, as well as the majolica tile dado for two staircases.

CATHOLIC CHURCH, BLACKPOOL.—The church of the Sacred Hearts in Talbot-road, Blackpool, has just been restored. The extensions—which double the accommodation—have been carried out at a cost of some 8,000l. Messrs. Pugin & Pugin, of London, were the architects.

ST. PETER'S CHURCH, ABBEYDALE, SHEFFIELD.—The new church of St. Peter, at Abbeydale, has just been consecrated by the Archbishop of York. An illustration of the building and a short description appeared in our issue for March 11, 1893. The masons, plasterers, and plumbers' work, and the seating in the nave have been executed by Mr. L. T. Wildgoose, of Sheffield and Mallock; the slating and lightning conductor by Messrs. Chadwick & Sons, of Sheffield; the glazing by Messrs. Mellows & Co., of Sheffield; the gasfitting by the Sheffield Gas Company; the mosaic floors by Messrs. Mainzer & Co., of London; and the heating by Messrs. J. C. & J. S. Ellis, Sheffield. Mr. Atkin has throughout acted as clerk of the works, and the architect has been Mr. Joseph Norton, of Sheffield.

WESLEY HALL, LOWER EASTON, BRISTOL.—On the 15th inst. Sir W. H. Wills, M.P., laid the foundation-stone of the new Wesley Hall, Lower Easton. The new building will consist of a hall, 70 ft. by 32 ft. This will accommodate 500 adults, or 750 children, and an additional 70 or 100 in an end gallery. The two sides will be arranged for sub-division into six class-rooms (size of each 14 ft. by 10 ft.), and separate entrances to the hall will be provided from both roads. There will be on the ground-floor, also, a room 23 ft. by 18 ft.; an infants' school, with gallery, for 120, and a small vestry. Upstairs will be two class-rooms, accommodating fifty each. The hall will have an open timber roof, and all the rooms boarded dados, the joinery being of pitch-pine, all the floors to be heated by hot water. The contractors are Messrs. Wilkins & Gosling, and the architect is Mr. J. H. La Trobe.

ALTERATIONS TO ST. GILES' CHURCH, CODICOTE, HERTFORDSHIRE.—The alterations at this church are now completed. The work has been carried out by Mr. William Wade, builder, of St.

Neots. The vestry-screen, choir-fronts, and altar-rail were made by Messrs. Hart, Son, Peard, & Co., of London, and the whole of the work has been executed from the designs of the architect, Messrs. Higgs & Rudkin, of London.

NEW U.P. CHURCH AT STEVENSTON, AYRSHIRE.—This new church has just been opened. It is in the Gothic style of the fifteenth century, and is seated for 450 persons. The cost is about 2,100l. Mr. H. J. Blanc is the architect.

FREE CHURCH, GRETNNA, CARLISLE.—A new Free Church has just been opened at Gretna. The new church is situated at the junction of the Gretna-road with the Springfield-road. In form the church is rectangular, the front elevation, of which a central porch is the main feature, facing the Gretna-road; and a vestry and cloak-room are provided in a wing at the back. The building is of red stone from the quarry at Corsehill. The end wall at the back of the interior of the church is relieved by a moulded formation of chancel arch, and pierced by a rose window over the rostrum, the latter, as well as the whole of the seats, being of selected pitch-pine. Above the front porch is another rose window, and a single light pointed window is placed on either side of the porch. There are also four two-light pointed windows on each side of the church. Mr. James Rae, of Springkell, has done the builder and mason's work; Mr. A. Tweedie, of Annan, the carpenter and joiner's work; Mr. C. J. Nanson, the slater's work; Messrs. J. S. Millar & Son, of Annan, the plumber's work; Mr. W. Norman, of Longtown, the plasterer's work; Mr. John McCulloch, of Annan, the painter and glazier's work; and Messrs. Cairns & Co. have fixed the heating apparatus and lamps; the whole having been carried out under the superintendence of the architect, Mr. T. Taylor Scott, of Carlisle.

RESTORATION OF MAWGAM CHURCH, CORNWALL.—The restoration of the ancient Church of St. Mawgan in Menage has just been carried out. The architect was Mr. Edmund Sedding, Plymouth, and Messrs. Richards & Eva, of Helston, were the contractors. The marble floor in the chancel has been executed by Messrs. Goad, Plymouth, the two carved communion chairs, in dark oak, are the work of Messrs. Harry Hems & Sons, Exeter, and the glazing was by Mr. W. Smith, London. The north-west window has been enlarged to its original length, consequent on the removal of a large mausoleum belonging to the Vyvyan family, while the north-east window has been filled with glazing containing most of the different forms of the cross. Seating has been re-formed out of the higher pews of early eighteenth-century type.

PARISH CHURCH, CRATHIE, INVERNESS.—The dedication of the new parish church of Crathie took place on the 18th inst. The church is built in the Early Scottish style, of white granite from the neighbouring quarry of Inver, and after designs by Mr. A. Marshall Mackenzie, A.R.S.A., of Aberdeen. The church takes the form of a cross; the nave and apse represent the shaft, while the two transepts typify the arms. The south transept is reserved for the Queen and members of the Royal Household, and the north is set apart for the heritors of the parish. In the west gable is the main door of the church, approached by an open porch of ornamented woodwork. A square tower rises over the building at the east end, and it is nearly 100 ft. in height, or 45 ft. above the ridge of the church-roof. The belfry is fitted with a chime of four bells.

BOARD SCHOOLS, ASPATRIA, CUMBERLAND.—New Board Schools at Aspatria have just been opened by Lady Lawson. The new schools are situated in the centre of the town, just off the main street, and will afford accommodation for 650 children. The schools have been built to the designs of Messrs. Moffat & Bentley, Whitehaven. The outer walls are of red freestone. The schools are in two departments—one for boys and girls, and one for infants. Besides the main rooms, there are large class-rooms. Messrs. Maxwell & Toppin were the contractors for the whole works, the sub-contractors being—For the carpenters and joiners' work, Mr. Joseph Rawlings, Aspatria; plumbing and glazing, Mr. D. Bell, Cockermouth; plastering, Mr. Altringham, Cockermouth; slating, Mr. Mandie, Maryport; painting and decorating, Mr. G. Bell, Aspatria.

ENTRANCE GATE, HOPETOUN HOUSE, SOUTH QUEENSFERRY.—There has just been completed a gateway at the South Queensferry entrance to the Hopetoun House grounds. The design was begun by Messrs. Wardrop & Anderson, architects, and completed by Dr. John Howard Anderson, who has, says the *Scotsman*, personally taken much interest in the wrought-iron work. The principal entrance consists of a gateway, 15 ft. wide, with massive piers, 22 ft. high and 5 ft. square, faced with Ionic three-quarter columns. On the top of the piers are to be placed the heraldic supporters of the Hopetoun house. Extending on each side is a crescent wall, divided into five divisions by double columns of the Tuscan order, and surmounted by a cornice. Standing on the top of a set of columns is a carved vase. Each wing is terminated by a massive pier rusticated and pannelled, and at right-angles outwards to these piers on each side is a wing wall with balustrade. The total length of the crescent, which terminates at the piers, is 90 ft. The main gateway is filled with a pair of wrought-iron gates, having in the centre of

each a medallion with wreath and the Hopetoun monograms. Above the gates is an ornamental fixed part of the gateway, pyramidal in form, broken up by curved bands, foliage, and scrolls, having the monogram of the present Earl and the date 1893 worked into it, and finished off with an earl's coronet. The total height of the gateway is 22 ft. In the first division on each side of the great gateway are smaller gates, while the other compartments are filled with fixed wrought-iron grills.

SANITARY AND ENGINEERING NEWS.

PURIFICATION OF THE DEE, ABERDEENSHIRE.—The sewage irrigation works at Ballater have just been completed. The farm is 16 acres in extent, and is a mile distant from the burgh of Ballater, the normal population of which is about 1,000, rising to, perhaps, 2,500 when the summer and autumn visitors are in force. About two-thirds of the farm was arable and the remainder waste land before being levelled. A small farm (3 acres) has also been laid out lower down the river, which will be irrigated by the sewage from the village of Kincardine O'Neil, the usual population of which is about 250. Similar farms are in course of being laid out at Braemar and Aboyne. The former is 10 acres in extent, and was all agricultural ground before being levelled. The latter contains 84 acres, of which 50 have also been laid out lower down the river. These two will intercept and treat the sewage from the villages of Castleton and Auchendryne (Braemar) and Aboyne. All the four farms lie close to the river-bank, and the object is to prevent the pollution of the Dee above the intake for the water-supply of the city of Aberdeen. These farms are distant respectively about 6, 8, 20, and 50 miles from the intake at Cairnait. The subsoil of the land to be irrigated is sand and very rough gravel.

RUTHERGLEN BRIDGE, LANARKSHIRE.—The memorial stone of a new bridge over the Clyde joining Glasgow to Rutherglen has just been laid. The new bridge, which replaces an older structure erected as far back as 1775, is a granite bridge of three arches, the centre one of which has a span of 100 ft., each side-arch having a span of 90 ft. The new bridge is 60 ft. between its parapets, which permits of a roadway 36 ft. wide, with a 12-ft. pathway for passengers on either side. The foundations have been carried down to the rock, through the overlying silt and boulder clay. The piers were founded by steel caissons sunk by means of compressed air, and carried down to depths of 57 ft. and 54 ft. respectively below high-water-mark. The abutments, which are 39 ft. 6 in. from front to back, are carried on timber-bearing piles, owing to the soft nature of the banks, and are backed with Portland cement concrete, the upper portion being rubble concrete in Arden lime. The engineers of the undertaking are Messrs. Crouch & Hogg, C.E., the contractors being Messrs. Morrison & Mason, Lim., also of Glasgow. The cost of the works is estimated at 64,000l.

SEWAGE SCHEME, ANSTLEY, LEICESTERSHIRE.—Anstley Sewage Works, Leicestershire, were opened a few days since. Four years ago it was decided that steps should be taken to carry out a new scheme, and Mr. W. H. Simpson, of the firm of Messrs. Simpson & Harvey, architects and surveyors, of Leicester, was appointed the engineer. The work was commenced in July last year. The whole of the village has been sewered, some 5,700 yards of drain-pipes, varying from 18 in. to 6 in. in diameter, having been laid. There are two bell-mouth junctions, 16 plain inspection man-holes, 17 junction chambers and man-holes, two flushing chambers and connexions to brook courses, 287 junction-pipes for house connexions, four ventilating shafts, and 20 man-holes. The sewage farm is situated about three-quarters of a mile from the village. The outfall main, which is about 1,200 yards in length, runs along the valley in close proximity to the Anstley brook. The total area of the farm is 11 a. 3 r. 11 p. The sewage is distributed over the farm by means of carriers with the grips prepared for its reception in the land. There are penstocks fitted at intervals of 50 yards throughout the length of the land. The total cost of the scheme (including land, wayleaves, professional charges, &c.) has been 6,300l.

STAINED GLASS AND DECORATION.

WINDOW, EAST ANTONY CHURCH, CORNWALL.—Under the superintendence of Mr. George H. Fowler Pyne, a stained-glass window has been designed and executed for a three-light window of this church in memory of William Henry Pole-Carew of Antony. The centre-light is a "Nativity," the two side-lights being "The Adoration of the Magi" and "The Shepherds" respectively, with backgrounds of no landscapes or perspective being used. The whole enclosed in a setting of elaborate tabernacle work. The designing and execution were entrusted to Messrs. Percy Bacon & Brothers, of London.

WINDOWS, ST. HILDA'S CHURCH, SUNDERLAND.—Three more windows in this new church have just been dedicated. They form part of a scheme to be carried through the whole church, commencing and

ending at the east window. The subject is, "I am the Vine; ye are the branches," and returning in the opposite direction in the upper lights. The artists were Messrs. Percy Bacon & Brothers, of London.

FOREIGN AND COLONIAL.

FRANCE.—On Friday last week, the Municipality of Paris organised a grand reception at the Hôtel de Ville, in honour of the visit of the Institute of Naval Architects. They had another reception at the Ministry of Marine, and an excursion on the Seine to St. Germain. The Académie des Beaux-Arts has awarded the Houleuvre prize to M. Nenot for his work at the new Sorbonne. An Industrial Exhibition is to be open at the Palais de l'Industrie on the 25th. There is talk of making use of the current of the Seine as a motive force for creating electricity at the 1900 Exhibition. The Henri Murger monument in the garden of the Luxembourg will be inaugurated at the close of this month.

The scheme for bringing the water of the Loing and Lunain to Paris is estimated to cost 25 million francs. The work will include two aqueducts from the sources, and a main aqueduct 73 kilometres long and 24 metres diameter. It will furnish 180,000 cubic metres a day. A monument to the memory of President Carnot is to be inaugurated at Nolay on August 11. This monument was the last work of the sculptor Rouleau, and consists of a white marble pedestal, ornamented with attributes of Justice and War, and a figure holding a plaque of red marble with an inscription. On the pedestal is a group representing the President Carnot in his death-dress, "France" receiving him in her arms. The Chamber of Deputies has under consideration a project for a railway from Etampes to Beaune-la-Rolande—about 98 kilometres.—A "Retrospective exhibition" has been opened at Reims in the Archbishop's palace, and will continue open till July 15.—The Municipality of Creil has decided on the destruction of the Church of St. Evremont, one of the most interesting examples of early Gothic in France.—The splendid mansion in the style of the Renaissance, at Toulouse, known under the name of the Hôtel d'Asseret, built by Francis I. for Margaret of Navarre, has been sold by public auction. The purchaser is a banker of Toulouse, who, it is said, intends to present it to the city.

MISCELLANEOUS.

RAILWAYS AND CANALS IN RUSSIA.—According to some recent Foreign Office Reports it is probable that this year there will be great extensions in the railway system of Russia. A large number of projects are under examination by the Committee of Ministers, and the line connecting Pskoff with Bologoe and thus placing Riga in direct communication with Rybinsk on the Volga, will soon be definitely settled, an event which the commercial community of Riga are eagerly looking forward to for giving a fresh impetus to the trade of the port. The long-talked-of project of constructing a railway from Walk to Pernau has been commenced. The line, which will be narrow-gauge and 77½ miles long, is expected to be ready for traffic by the end of the year. The town of Fellin, 30½ miles from the Moiseiskil station, on the Walk-Pernau branch, will also be connected by a narrow-gauge railway. The company which has obtained the concession for these and other railways undertakes to construct them without any subsidy from the Imperial Government, but is authorised to issue bonds for two-thirds of the cost, and the capital is to be repaid on the expiration of eighty-five years, when the lines become the property of the Government, which reserves to itself the right of purchase after the first eighteen years. The company is allowed to charge a higher rate for both passengers and goods than the tariff in vogue on other Russian railways. The opening of these railways will be a great boon to the agricultural and trading classes of the provinces of Livonia and Pskoff. The old high waterway that formerly existed between the Black Sea and the Baltic is again under discussion. From the surveys lately made it appears that the route from Rybinsk to Riga is half as long again as that to St. Petersburg by the Marien Canal system, and that the line of the Volga Duna is higher than that of the Meuse system, and therefore there can be no question of transferring the Volga trade from St. Petersburg to Riga. The cost of connecting the Dnieper with the Western Duna, and the latter with the Lovat, is estimated at 645,000l. The route laid down is:—Kieff to Orsha, 482 miles; Loutch-Orsha connexion, 664 miles; Western Dnieper section, 374 miles; Orsha and the canal to a distance of 365 miles; Lovat, 278 miles; Lake Ilmen, 20 miles; Volkhoof, 134 miles; Ladoga Canal and Neva, 111½ miles; total, 1,166½ miles; which is the same route as described by Nestar, the old historian of Kieff.

IRON CASEMENT FOR OPENING EITHER WAY.—Messrs. Farrar & Co.'s iron casement, called the "in-and-out" casement, made to open outwards ordinarily, but to open inwards when desired for cleaning, is a very satisfactory one. The rebates are arranged for outward opening, but what may be

called in the interior beading is a cover to the whole sash bar all round, which is binged at the bottom, and on releasing the fastenings at the top will fall backwards towards the interior, the sash then opening inwards without obstruction. The contrivance is very simple, and seems calculated to maintain a perfectly water-tight window.

THE BRISTOL MASTER BUILDERS' ASSOCIATION have decided to visit Bridgwater and the Quantocks on the occasion of their annual outing on the 27th inst.

PERMANENT INDUSTRIAL EXHIBITION IN ATHENS.—A permanent industrial exhibition has just been opened in Athens, which is to be open every year from March 1 to June 30, and from September 15 to January 15. In addition to Greek industrial products, foreigners are admitted to exhibit articles tending to promote Greek industries.

TELEPHONE: LONDON TO BERLIN.—The Belgian Government are attempting to establish telephonic communication between Brussels and London on one side, and Brussels and Berlin on the other.

APPOINTMENT OF SANITARY INSPECTOR, TONBRIDGE.—At the monthly meeting of the Tonbridge Urban Council on the 5th inst. the Health Committee recommended that Mr. Bradley, the Inspector of Nuisances, be appointed permanently. The recommendation gave rise to a little opposition, but the motion was agreed to.

A NEW STEP IN TRANSATLANTIC EMBARKATION.—The great step just made by the railway and dock authorities at Liverpool in the direction of facilitating Transatlantic travel deserves passing notice. An extension of the railway lines to the central landing-stage has been made with a view of enabling travellers to embark immediately on the arrival of the boat trains, this being satisfactorily accomplished on Saturday last, in connexion with the sailing of the *Canader Campana*. The saving in point of time is evident from the fact that passengers who departed from Euston at noon had actually left port five hours later, the journey having occupied four hours and a quarter, and the transference of passengers and luggage about half-an-hour. An incoming liner, the *Umbrina*, was also brought alongside the landing-stage the same evening, the passengers and baggage being disembarked with unprecedented celerity. The event naturally created the liveliest interest in Liverpool, and it is certain that travellers will regard the new method of embarkation as a most decided improvement upon the intermediary tender.

FRENCH BREWERY WELL.—A 2-in. Driven Tube Well has just been fixed at M. C. Ennaut's Brewery, Pont de Nieppe, near Dunkerque, the extraordinary depth of 112 ft. from surface being reached. The perforated point forming the bottom of the well was covered with a fine perforated brass strainer, as the water-bearing bed consists of fine sand. A supply of 800 gallons per hour has been obtained, which rises close to ground level, and is connected to a direct-acting steam-pump. 7 ft. of peat, 13 ft. running sand, 49 ft. of stiff clay, and 43 ft. of sand were passed through. Messrs. Alfred Williams & Co., of London, supplied the well, and the work was carried out under the supervision of M. Georges de Geyter, Consulting Engineer at the Brewery.

ANN-STREET, POPLAR, IMPROVEMENT SCHEME.—It is announced that the London County Council have completed the arrangements in regard to property scheduled under this scheme, and that the small cottage property near the East India-road, between Brunswick-road and St. Leonard's-road, will shortly be demolished.

CARDIFF EXHIBITION.—A meeting of a special committee of the Cardiff Exhibition Committee to select plans was held on the 17th inst. at the Town-hall, Cardiff. Mr. W. Seward, architect, attended, and produced plans of the exhibition buildings, which he estimated would cost 7,500l. Communications were read from Mr. C. J. Jackson (Chairman of the Arts section), and Mr. D. T. Alexander (Chairman of the Horticultural section), pointing out that more space would be required if the success of those sections was to be assured. The Chairman observed that the demand for more space seemed to be general. After a discussion the plans were adopted.

BOROUGH SURVEYORSHIP, PONTEFRAC.—The Pontefract Town Council have appointed Mr. Arthur Oddy, the Assistant-Surveyor in the Borough Engineer's department, at West Hartlepool, as Surveyor and Nuisance Inspector for Pontefract, in place of Mr. James Heseltine, resigned. There were over sixty applicants.

LEGAL.

THE RIGHT TO AIR:

IMPORTANT CASE IN THE COURT OF APPEAL.

The case of Chastey v. Ackland came before the Court of Appeal, consisting of Lords Justices Lindley, Lopes, and Kay, on May 17 and 18, and in which their Lordships delivered a considered judgment on Monday last, the 17th inst.

The case came before the Court on the appeal of the defendant from an order of Mr. Justice Gore, in an action tried before him at Exeter in February last, granting a perpetual injunction in a mandatory form restraining Mr. Ackland from permitting the continuance of a new building he had erected upon his freehold premises, No. 24, West Southernhay,

Exeter, so as to interfere with the access of air to No. 23, the house adjoining, of which the plaintiffs, two ladies, were the freeholders.

Mr. Cozens Hardy, Q.C., M.P., and Mr. Foote appeared as counsel for the appellant (the defendant); and Mr. Warmington, Q.C., M.P., Mr. H. E. Duke, and Mr. H. Broughton Edge, for the respondents (the plaintiffs).

Mr. Cozens Hardy, in opening the case, said that Mr. Justice Cave had granted a perpetual injunction in a mandatory form restraining the defendant from continuing his new building at a higher level than that which was replaced. The peculiarity of the case was that the learned Judge (after viewing the premises) had granted an injunction, not on the ground of an interference with the light, but, for the first time in the history of the Courts, for an interference with the access of air to the plaintiffs' premises. The defendant had, before the writ in the action had been issued, or certainly before an injunction had been applied for, erected a portion of his new building. Part of the case made on the pleadings was that there was interference with the access of light to certain windows in the plaintiffs' house, but he did not propose to deal with that then, because the learned Judge had said that there was no such interference with the light as to justify an injunction, and the *res* would be sufficient compensation for any damage done in that way. But his Lordship had held that the plaintiffs had a right to the passage of air coming over the defendant's property to them, and that their house was made much more inconvenient on that account, and less valuable, and he granted a mandatory injunction requiring the defendant to pull down a building which he had erected on his own land. The question was whether the defendant was or was not entitled to erect on his own land a building which did not interfere with the ancient lights of another. It might well be that what the defendant had done might have rendered the plaintiffs' house less comfortable or less valuable, but it was for the Court to say whether it was a legal wrong for him to erect a building on his own land, which, though it did not interfere with ancient lights, might interfere to some extent with the passage of air.

Lord Justice Lindley remarked that the finding of the learned Judge in the Court below certainly pointed to the fact that he thought that there had been an interference with the plaintiffs' ancient lights.

Mr. Cozens Hardy replied that that was so; but the learned Judge had said that he would not grant a mandatory injunction for the injury done to the light, which was covered by the *res* damages he awarded to the plaintiffs. What the learned Judge had said was that the plaintiffs were entitled to what he called the ventilation coming between the houses.

Mr. Foote, who followed on the same side, said that he did not dispute that there was some evidence of nuisance in the case, but he contended that there was no evidence of any nuisance on which the Court ought to act. Assuming against himself that if the new building was injurious to the health of the occupants of the plaintiffs' house that would entitle them to an injunction, his submission was that the air had not been diminished to such a degree as to involve danger to health. He felt that it would be hopeless on the question of light to ask their Lordships to reverse the decision of the learned Judge in the Court below, who had himself viewed the premises, and the defendant did not appeal against the *res* damages awarded to the plaintiffs on that head. But it was no part of the plaintiffs' case that anything that the defendant did caused smell, and the learned Judge did not rely upon what he saw with regard to the air. There was attached to the Drill Hall and in the plaintiffs' own yard causes of smell.

Lord Justice Lindley: But before you erected your building there was a sufficient current of air to make it innocuous.

Mr. Foote admitted that that was possible, but submitted that even so, it would form no cause of action. The medical evidence brought forward on the part of the plaintiffs did not go to the extent of showing that what the defendant had done was injurious to health. The opinion of Mr. Woodman, the Medical Officer of Health, and of the plaintiffs' other medical experts, went to show that the new building would make the plaintiffs' house less healthy than it was before, and would account for smells and fumes finding their way into the back windows. But, in cross-examination, Mr. Woodman would not say that the plaintiffs' house had been rendered insanitary.

Mr. Warmington submitted that their Lordships would not interfere with the conclusion at which Mr. Justice Cave had arrived, after seeing the witnesses, and himself visiting the premises. Under the circumstances, the decision appealed from was no less valuable than the verdict of a jury. What the defendant had done had rendered the plaintiffs' property less wholesome, and the plaintiffs had suffered, so far as the comfort of their house was concerned, in personal discomfort. He contended that that constituted an actionable wrong, inasmuch as it was a nuisance.

Lord Justice Lopes, in reading the judgment of Lord Justice Lindley and himself, said the case, which was tried at Exeter, resulted in judgment for

the plaintiffs, and an injunction restraining the defendant from maintaining a certain new building beyond a certain height, on the ground that it obstructed the light to which the plaintiffs were entitled in respect of certain ancient lights, and on the ground that it obstructed the free passage of air over and above the plaintiffs' premises, and therefore created a nuisance. So far as the loss of light was concerned the plaintiffs were awarded *res* damages, but on this point there was no appeal, the appeal being in respect of the alleged nuisance. It was said that the defendant's premises prevented the carrying off of bad smells by the interruption of the free passage of air. Every man had a natural right to enjoy the air pure and free from any noxious vapours, and any man who sent foul air into his neighbour's premises ought to be restrained, but the Court could not impose upon his neighbour the obligation to keep away improper smells. He was unable to agree with the learned Judge who had tried the case that the plaintiffs had any case in connexion with the claim for nuisance. It was contended that, irrespective of the nuisance, the plaintiffs had a right to the free passage of air over and above their premises, and a right to have every disagreeable smell carried away by the current of air that would pass over the premises, which right, it was said, the defendant by his new building had infringed. There was, however, nothing to prevent the defendant building on his own land, and such a right as the plaintiffs had set up could not be supported either by the authorities or the Prescription Act, and a man was not bound to see that his neighbour had proper ventilation. In their opinion, what the defendant had done he was entitled to do, and constituted no legal wrong. In those circumstances the judgment for the *res* would stand, and the defendant would pay the costs with regard to that issue, but he (the defendant) would be entitled to such costs as were incurred by the contention in respect of the air, together with the costs of that issue.

Lord Justice Kay concurred.

Lord Justice Lindley said that, considering the importance of the case, he should like to add that no one had a right to complain of a neighbour building on his own land, even though it might diminish the flow of air on the land adjoining, unless there was an immemorial right to the user, or an agreement binding the owners not to build. In the present case there was no such agreement, and the plaintiff had failed to prove the existence of any contract binding the defendant not to build over his own land. The plaintiffs' claim to relief could not be sustained, and the defendant was entitled, and must succeed on his appeal. The plaintiffs would, therefore, have their judgment for the *res* and the costs incurred on that issue, but the defendant must have the costs of the other issue, together with the costs of the appeal.

Judgment accordingly.

IMPORTANT POINT UNDER THE METROPOLITAN MANAGEMENT ACT, 1882.

The case of the London County Council v. Davis came before Mr. Baron Pollock and Mr. Justice Wright, sitting as a Divisional Court of Queen's Bench, on the 13th inst., which raised the question whether a certain passage not dedicated to the public, and only leading to certain proposed artisans' dwellings was a street "for Metropolitan Management" within the meaning of Section 7 of the Metropolitan Management Act, 1882.

The case came before the Court in the form of a special case stated by a Metropolitan magistrate at a summons, which was taken out against the respondent for breach of Section 7 of the Act, which provides that, where it is intended to form or lay out "any road, passage, or way for building, as a street, for the purposes of carriage traffic, or of foot traffic only, in such manner that such road, passage or way, will not afford direct communication between two streets, such person shall, at least three months before such road, &c., is begun to be formed or laid out, give notice of such intention to the Board." In the case of the Board declining to sanction such road, it is not to be laid out, and a penalty is imposed on any person who lays out any such road contrary to this section. It appeared that the respondent had given no such notice, and began to build certain artisans' dwellings in the rear of Hunt-street. Such dwellings were to consist of forty separate sets of chambers in two blocks, with about ten separate entrances on the ground floor on each side. Each block was to contain about 150 persons, and the buildings were to be approached from Hunt-street through a gateway to be erected at the entrance of the approach to these buildings. This approach, which was the subject of the summons, was to consist of a court or passage 200 ft. long and 20 ft. wide, with the buildings opening into it on either side. On the respondent's plan this space was called a "light area"; on that of the appellants it appeared as a "new street." This passage would not afford any communication with any street other than Hunt-street, and was intended and is for the use and convenience of the tenants of the said buildings fronting thereon. No road or passage-way had existed on the site of the passage previously. The

contention of the respondent was that he had not committed any offence, because the passage was only a private entrance for the use of the tenants of the artisans' dwellings and had not been dedicated to the public. The learned magistrate dismissed the summons on the ground that the respondent had not commenced to lay out a new road, passage, or way as a street for foot traffic, as it was not intended to be used by the public, and in his opinion was not laid out as a street for foot traffic within the meaning of the Act.

At the conclusion of the arguments of counsel Mr. Baron Pollock, in giving judgment, said that he did not consider the judgment of the Court to be a decision on a question of principle, but rather on a state of facts. The magistrate had come to the conclusion that the passage was not laid out for traffic within the meaning of the Act, and in his (Mr. Baron Pollock's) opinion that conclusion must not be disturbed. Looking at the space which was here left for access to the tenements from the public street, it was a very different case from that of a way which was really laid out as a street, except that the builder had enclosed it with gates at one end or both. A builder could not thus prevent a passage which would otherwise be a street from being a street within the Act. There was no doubt that in the present case the way was a new way, and the magistrate was entitled to find for what purpose it was created. In his opinion his decision must be upheld.

Mr. Justice Wright, in concurring, said that the decision must not be taken as an authority as to what was or was not "traffic" within the Act.

The appeal was accordingly dismissed. Mr. Horace Ivory and Mr. Daldy appeared as counsel for the appellants; while Mr. Cripps, Q.C., and Mr. Scott Fox represented the respondent.

CAPITAL AND LABOUR.

STATE OF EMPLOYMENT IN MAY.—Most of the industries from which returns have been received by the Labour Department of the Board of Trade have shown, according to the *Labour Gazette*, a steady improvement in employment in May as compared with April, with the result that the percentage of unemployed in all the unions making returns has fallen from 6.5 to 6.0. The building trades are busy, and the percentage of unemployed in unions making returns has fallen from 3.3 to 2.5, compared with 3.3 per cent. in May, 1894. There were 26 disputes in the building trades during the month, 18 being chiefly due to wages questions, 5 to working arrangements, and to questions of trade unionism.

LANCASHIRE FEDERATION OF BUILDING TRADE EMPLOYERS.—The first general meeting of this newly-formed Association was held at the Derby Hotel, Accrington, on the 18th inst., when Mr. John Fecit, Blackburn, presided over about fifty representatives from Accrington, Blackburn, Bolton, Burnley, Chorley, Colne, Darwen, Nelson, Preston, and Rochdale. The Chairman, in opening the meeting, spoke of the necessity that existed for employers to organise at the present time, not only to combat more effectually combinations of the workmen when they try to impose unfair restrictions on trade, but to obtain from architects and the public generally, juster and more generous treatment. The minutes of the preliminary meetings having been read and confirmed, the report of the Provisional Committee was then presented, and was adopted and ordered to be printed and circulated. Mr. John Fecit (Blackburn) was elected President for the ensuing year; Mr. Councillor Cunliffe (Bolton), was elected Vice-President, Mr. F. W. Briscoe (Bolton), Treasurer, and Messrs. W. Shepherd (Rochdale), and J. Hawley (Colne), Auditors, while the following form the Executive Committee:—Accrington, Mr. James Waddington, Mr. George E. Cunliffe; Blackburn, Mr. John Caton, Mr. R. Highton; Bolton, Mr. Councillor Cunliffe, Mr. F. W. Briscoe; Chorley, Mr. Joseph Catterall; Colne, Mr. James Laycock; Darwen, Mr. Councillor Cocker; Nelson, Mr. Caleb Greenwood; Preston, Mr. J. G. Christian and Mr. T. H. Kellett; Rochdale, Mr. R. Robinson. Mr. John Tomlinson, of Preston, Secretary of the Master Builders' Association in that town, was elected Secretary. On the motion of the Bolton representative, it was decided to try to affiliate the Federation to the National Association of Master Builders of Great Britain. The Darwen representatives reported the settlement of the masons' strike in their town, which was approved; and after hearing the Chorley delegates, it was unanimously agreed to support the local employers in their dispute with the operative joiners. It was also decided to adopt a form of Conditions of Contract, &c., to be approved by the Committee for use in the federated towns not at present having one.

MEETINGS.

FRIDAY, JUNE 21.

Liverpool Engineering Society.—Excursion to the mill, severest works, pumping station, and refuse destructor of Camille.

Glasgow Architectural Association.—Visit to Dalziel House, &c., Motherwell.

SATURDAY, JUNE 22.

St. Paul's Ecclesiastical Society.—Visit to the churches of Horencroft and Umpster, under the guidance of Mr. F. C. Clouston, F.R.I.B.A. Train leaves Fenchurch-street at 9.30 p.m.

Institution of Junior Engineers.—Visit to Mr. Hiram S. Maxim's workshops at Balfour's Park, Bexley. Train from Cannon-street (S.E.R.) at 11.15 p.m.

Liverpool Engineering Society.—Excursion (concluded).

Edinburgh Architectural Association.—Annual Excursion—Mount Stuart House, Rothsay Castle, St. Blane's Chapel, Rothsay Church.

MONDAY, JUNE 24.

Royal Institute of British Architects.—(1) Sixteenth general meeting (ordinary), to present the Royal Gold Medal for the promotion of architecture to Mr. James Brooks, for his executed works as an architect. (2) A special general meeting (for members only) then to be held to receive and consider a recommendation of the Council to extend, under the provisions of the charter, a class of subscribing members, to be called "Craftsmen", and to make and adopt by-laws which shall define, regulate, and prescribe the conditions of membership and the mode of election. The admission and the privileges, obligations, and benefits of, and the payments to be made by, the proposed new class.

WEDNESDAY, JUNE 26.

Builders' Foremen and Clerks of Works' Institution.—Half-yearly meeting of the directors. 8 p.m.

THURSDAY, JUNE 27.

Association of Municipal and County Engineers.—Annual meeting, to be held at Halifax.

FRIDAY, JUNE 28.

Association of Municipal and County Engineers.—Annual Meeting, Halifax (continued).

SATURDAY, JUNE 29.

Architectural Association.—Visit to Audley End, Essex, and to the Parish Church of Saffron Walden (see advt.).

Association of Municipal and County Engineers.—Annual Meeting, Halifax (concluded).

RECENT PATENTS:

ABSTRACTS OF SPECIFICATIONS.

9,948.—**SEWER VENTILATION:** L. Lowndes.—A process for the removal of poisonous air, gases, &c., from sewers, drains, and like situations. For this purpose are used, a combustion furnace, fan, blower-cylinder, or other air exhausting and compressing engine. The injurious gases are drawn, by the exhausting action of the engine, along the sewers and drains to a receiver, which may be a highly-heated oven or furnace, situated near the main sewer, by which means the poisonous air in passing through becomes purified before being liberated into the atmosphere.

13,239.—**BALL-COCK:** J. Templeton.—This invention is designed to enable a full-way ball-cock to close against any water pressure. The other end of the lever or rod which carries the ball is shaped like a portion of a "heart cam," and revolves on a fulcrum below the valve of the cistern and supporting it in a closed position. When the water falls in the cistern the cam is made to revolve and allow the valve to open. A similar movement in the opposite direction when the water rises closes the valve.

14,147.—**PARTITIONS:** J. Golding.—Relates to a partition for buildings to be used for the ordinary bath and plaster partitions. Consists of vertical tension wires having breadths of metallic lattice interwoven and secured together, and a body of plaster covering the whole upon both sides.

15,380.—**VENTILATORS:** R. Rossmann.—A ventilator, chiefly for railway carriages, consisting of a tube or circular case, surmounted by a dome-shaped cover, a sufficient opening being left between the case and cover for the passage of air. Around the ring, 2-shaped in vertical section, is supported by strips, leaving suitable space for the entrance and exit of air.

8,813.—**GIRDERS:** H. Bladen and another.—Relates to girders used for supporting floors and ceiling joists, and consists of top and bottom members, formed of T bars, which are connected together by two sets of vertical web-plates, rivetted in place by sets of rivets. The ends of the top and bottom members of the girder are preferably fitted into cast iron shoes.

7,366.—**PAINT:** H. Kohler and another.—An invention for producing paint, suitable for metallic surfaces, from the tar or residue obtained in the manufacture of oil or fat-gas. The tar is heated to a temperature of 150 degs., so as to relieve it of all substances which boil at a lower temperature. The residue is then mixed with light hydrocarbons, such as benzene, with or without the addition of drying substances.

7,402.—**VENTILATING GRATES:** M. Landier.—Relates to the class of grates which are supplied with cold and give off warm air. The invention consists chiefly in a movable valve in connexion with the air-chamber, which controls the amount of air admitted to the room, and to give such an upward direction. The valve is fitted with little clips or hooks at either end, which are designed to engage with the edges of the grate-front and hold the valve in any position. A gauze wire screen may also be fitted behind the valve and held in position by suitable means.

NEW APPLICATIONS FOR LETTERS PATENT.

JUNE 4.—10,915, W. & R. Meigh, Kiln for Firing Pottery-ware.

JUNE 5.—11,060, B. Banks and others, Machine for Trencing, Panel Cutting, Shouldering, Tenoning, and Serbing Wood.—11,136, W. W. Kenzie, Resilient Sliding Windows.—11,195, A. Callister, Raising and Lowering Window Sashes, and retaining them in any desired position.

JUNE 6.—11,123, W. & N. Thomson, Water-closets, Valves, and Supply Cisterns for same.—11,132, D. Simpson and A. Cross, Hinge for Opening and Closing Window Sashes.—11,136, W. W. Kenzie, Resilient Sliding Windows.

JUNE 7.—11,166, J. Glendenning, Door-Knobs.—11,167, B. Hill, Extension-Ladders.—11,216, C. Lenx and J. Stumpf, Window Frames and Sashes or Casements.

JUNE 8.—11,267, W. Stark, Manufacture of Cement.—11,295, E. Bauer and F. Fried, Water-waste Preventors for Purposes.—11,294, T. Sylvester, Construction of Windows.

PROVISIONAL SPECIFICATIONS ACCEPTED.

8,959, J. Tennant and others, Gold Plate for Interior Gilding.—8,993, C. Bickerdick, Gully Cleanser.—9,292, L. Sheard, Board and Trestle Combination for Use of Paperhangs.—9,836, B. Brookes, Window-fasteners.—9,910, A. Sennett, Fire-grates and Stoves.—10,142, J. Armstrong, Electric Gas Lighting Devices.—10,293, J. Waterfall, Metallic Sockets for Picks.—10,255, W. Peyton, Stove or Fire-grate.

COMPLETE SPECIFICATIONS ACCEPTED.

(Open to Opposition for Two Months.)

19,143, A. Sharp, Door and Window-frame for Use in Concrete Buildings.—13,731, W. Ward, Turn-screw.—15,105, K. Haddan, Chimney-cowls.—8,812, P. Bright, Water-closets.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

MAY 30.—By *Hunter & Hunter*: L.g.r. of 361, Kirkwood-rd., Havestock Hill, u.t. 71 yrs., g.r. 41, 300l.; l.g.r. of 381, Wellesley-rd., u.t. 28 yrs., g.r. nil.; l.g.r. of 91, Gorbam-pl., reversion in 70 yrs., 200l.; "Princess of Wales" public-house, York-rd., Wandsworth, l.g.r. of 81, reversion in 62 yrs., 435l.; l.g.r. of 81, 82, Ash-grove, Bethnal Green, reversion in 31 yrs., 250l.; at 23, Canterbury Mews, Newington, u.t. 48 yrs., g.r. 34, 100l.; l.g.r. of 211, Montpelier-pl., Knightsbridge, u.t. 32 yrs., g.r. 71, 210l.; l.g.r. of 121, Bramley-rd., Notting Hill, l.g.r. 261, 242l.; 54, Rawlings-rd., Chelsea, u.t. 47½ yrs., g.r. 81, r. 504, 500l.; 2, Westbourne-st., u.t. 61 yrs., g.r. 104, 100l.; 84, Akerman-st., u.t. 28 yrs., g.r. 68 yrs., g.r. 71, 304, 300l.; 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 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587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

May 31.—By *Mallett & Co.*: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.

May 31.—By *W. W. Kenzie*: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.

May 31.—By *W. W. Kenzie*: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.

May 31.—By *W. W. Kenzie*: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.

May 31.—By *W. W. Kenzie*: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.

May 31.—By *W. W. Kenzie*: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.

May 31.—By *W. W. Kenzie*: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.

May 31.—By *W. W. Kenzie*: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.

May 31.—By *W. W. Kenzie*: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.

May 31.—By *W. W. Kenzie*: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 9

LONDON.—For rebuilding the "Britannia" public-house, High

street, Camden Town, N.W., for Mr. T. J. Wakley. Mr. Horace M. Wakley, architect. Quantities by Mr. H. Dow-White.—

[illegible]

Surveyor to the Vestry:—
Jno Grace & Son £1,268 0 | E. Harland & Son £828 2

J. Chessum & Sons....	1,649	0	J. V. Kiddle & Sons	793
J. J. Kayment & Son..	1,623	0	Campbell, Smith, & Co..	788
Chas. Stolle	949	10	Graham & Banks, 445,	
J. J. Lewen.....	885	0	Oxford-street, W.*	625

LONDON.—For rebuilding Catholic schools, Parliament-street.
Bethnal Green, for the Rev. Father Gaggan. Mr. Francis Tasker
architect, 5, John-street, Bedford-row.—
Harry £ 300 Callan 2/6
Lough & Co. 1/8 1/4 Browning 99
Harper 1/6 0 Beer & Cash 99

Walker	1,333	Edwards & Medway	1,22
Johnston	1,290	Street	1,1

LONDON.—For building a house in Kidlington (see p. 100), Hamp

Mr. Bailey.....	£1,503	H. G. Davenall	£1.37
Mattock Bros.....	1,412	F. & E. Cooper (accepted)	1.37

road and Downs Park-road, for the Hackney Vestry. Mr. J. Lovegrove, C.E., Town Hall, Hackney.—

away
away
sup yd.

	Car- p. Per	Gro. Car- p. Per	For P. Per
Haynes Bros.	5. d.	5. d.	5. d.
Victoria Stone Co.	8. 0	0. 6	4. 0
	7. 5		0. 0

A. C. W. Holman & Co.	5	21	4	3
W. Garstin & Sons	5	0	7	0

Patent Indurated Stone Co.	5	9	0	5	1
Litho Paving Co.	4	8	0	3	5
W. B. Wilkinson & Co.	5	6	0	4	0
W. Bardell.....	5	6	0	3	0

Patent Paving and Construction Co.	5	1	6	3	2'
M. Macleod & Co.	5	1	0	6	3 11
J. Mowlem & Co.	5	0	1	0	4 0
W. Adamson	4	11	0	3	3 6
Jones's Annealed Concrete Co.	4	10	0	-	1 9

[illegible]

LONDON.—For repairs, painting, and sundry works to the office
of the *Daily Chronicle*, in Fleet-street and Salisbury-court, E.C. Mr.
Henry L. Florence, architect. Quantities by Mr. J. F. Bull :—
Charteris £7984 | Simmon & Son £1700

Colls & Sons.....	2,157	Kulby & Gayford	1,08
Worsley & Co.	2,147	W. Cubitt & Co.*	† 1,015

* Accepted.

† Exclusive of wall tiling, £186, and ventilation, £70.

Mouth " Tavern, Hart-street, Bloomsbury, W.C., for Mr. J. G.

Wrightson, surveyors.—	
Patman & Fotheringham...	£1,300
Courtney & Fairbairn	1,103
Anley	£1,663
Gould & Brand	908

LONDON.—For pulling down and re-building "The Cricketers" public-house, Wellington-street, Camden-town, N.W., for Messrs. Courage & Co. Mr. Alfred J. England, architect. Quantities by Mr. Jos. Rookwood:—
 Todd £4 8s. | Harris & Wardrope £4 6s.

Kilby & Gayford	4,657	Toms	4,789
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LONDON.—For the erection of river-side premises, Pickle Herring-street, Southwark, for Messrs. Wm. France & Co., Limited, Messrs. Barnes-Williams, Ford & Griffiths, architects, 74, Railway

Johnson	£10,142	£9,010
White & Co.	9,715	9,183
Hall & Beddall	9,554	9,066
Colls & Sons	9,531	9,000
F. & H. F. Higgs	9,525	9,000
H. G. Williams		
Falkner		
Bilham		
Wm King		

Greenwood	9,262	(Accepted) ..	8,598
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LONDON.—Accepted for re-erection of premises, Walworth Road, for Messrs. W. & P. Macowan
John Marsland £3 8 95

LONDON.—Accepted for the erection of workshops at the non Workhouse, Gordon-road, Peckham, for the Catered non-ardians —
J. O. Richardson, Albert Works, Peckham £2,583

MANSFIELD (Notts).—For additions and alterations to school buildings, for the Managers of St. Peter's Schools. Mr. Aug. H. Potter, architect, 45, Wessington, Mansfield —
Bradley & Roe £555
H. T. Baker £599
W. Bains 515
Amended tender accepted.

MIDSUMER NORTON (Somerset).—For the supply and delivery of water-pipes and fittings (section A) for the districts of Clavdown and Welton, for the Urban District Council. Mr. W. F. Bird, Surveyor, Market Hall, Midsummer Norton. Quantities by Surveyor —
D. H. Porter £424 0 0
Clay Cross Co. £119 18 3
Spittle, Ltd. 368 17 6
Bigger, Wall & Co. 314 5 0
C. Laidlaw & Sons 37 14 0
Blakelorough & Sons 325 8 9
Norton Iron Co. 295 12 10
Glentfield Iron Co.
Watson, Gow, & Co. 293 13 11
Kilmarnock* 294 12 7

Trenching, Joining, Laying Mains, Making Connections.
Cliggs, Wall & Co. £279 1 8
W. A. Caley, Mid-
John Peattie 275 0 6
D. H. Porter 25 0 0
C. Green 258 2 4
* Accepted.

NEWPORT (Mon.).—For the erection of schools, Malinde, for the Rev. M. Bailey, Mr. P. R. Bates, architect, 4, Commercial-street, Newport —
Charles Lock £2,750 0 0
W. A. Linton £2,140 0 0
Edwyn Richards 2,219 0 0
Wm. Price 2,275 0 0
Chas. Wilkins 2,158 0 0
Dyson Parritt (accepted) 1,994 0 0
[All of Newport.]

PETERBOROUGH.—For the erection of dwelling-house, New England, for Mr. Cole. Mr. J. G. Stillebrass, architect, North-street, Peterborough. Quantities by architect —
Bailey £300 0 0
Bunder £255 0 0
Page 275 0 0
Nichols 277 0 0
Sibley 275 0 0
Gracknell 297 0 0
Watson (accepted) 285 0 0
[All of Peterborough.]

PURTON.—For supplying 10 tons broken kerbs, granite, for the Town Council. Mr. J. H. L. Bates, architect, 4, Commercial-street, London —
Perton
Sandell & Co. 10 9
J. Somersfield 10 5
C. La Maistre 10 5
A. & F. Mawlin, London*
* Accepted.

PORTMADOC (N. Wales).—Accepted for alterations, &c., to the Metropolitan bank buildings. Messrs. T. Roberts & Son, architects Portmadoc —
Robert Roberts, Cricieth £397 10

POTTERS BAR.—For additions to schools, Little Heath, Potters Bar, Herts, for the Building Committee. Mr. J. K. Manning, architect, Millwood Estate Office, Horse Hill, S.E. Quantities by architect —
Holiday & Greenwood £495
J. Hunt 475
Willmott & Son 439

PURTON STONE (Wiltshire).—For erecting school at Purton Stone, Wils. Mr. W. H. Read, architect, Swindon —
J. Barrett £590 0 0
J. Williams 505 0 0
H. G. Smith 544 0 0
G. Whitsham £647 0 0
J. Shales 505 0 0
H. G. Smith 544 0 0
Barnes, Purton* 500 0 0
* Accepted.

ST. MARY CRAY (Kent).—For restoration of side windows, &c., of St. Mary's Parish Church. Mr. Arthur Vernon, architect, 29, Cockspur-street, London —
Samuel Page £239
Robert A. Lowe £239
Thomas Knight 235
J. Potter (accepted) 235

SHIRESBURY. For paving, &c., Twenty-street, for the Corporation. Mr. W. C. Eddowes, Borough Surveyor, The Square, Shirebury —
John Brown, Shirebury, at schedule of prices.

STRATTON ST. MARGARET (Wiltshire).—For extending vacant wards at the Union Workhouse, Stratton St. Margaret, Wils. Mr. W. H. Read, architect, Swindon —
J. Williams £575 0 0
J. Barrett 574 12 6
G. Whitsham £575 15 0
* Accepted.

TADCASTER.—For the supply of 4,000 tons of Whinstone, and 4,000 tons of limestone, for the Rural District Council. Mr. Thomas Scott, Surveyor, Aberford, Leeds —
Lerton
George Hoeman, York. 1 9
John Hunt, Leeds. 1 9
A. L. Maddison 1 9
J. G. Whitham, York. 1 9

TUNSTALL (Staffs.).—For extension of Victoria Infirmary for the Tunstall Urban District Council. Mr. A. R. Wood, architect, 1, 1904 —
Cardridge £2,500
Cope £2,500
Godwin 2,500
Bryford, Tunstall* 2,500
* Accepted.

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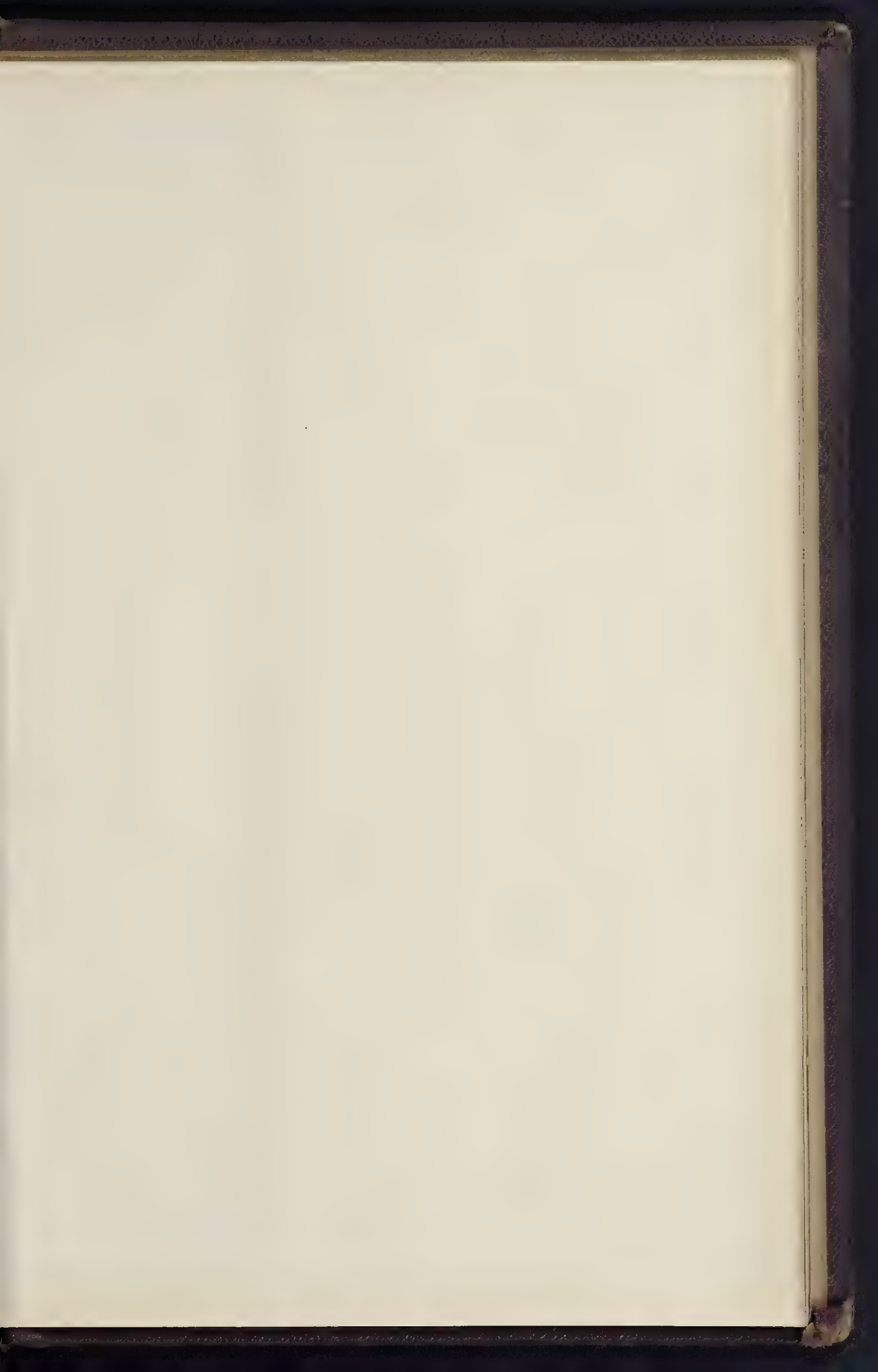
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The Builder.

VOL. LXVIII. NO. 2734.

JUNE 27, 1895.

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Road-screen, St. John the Baptist Church, Kensington.—Messrs. James Brooks & Son, Architects.....	Double-Page Photo-Litho.
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Coventry Municipal Buildings Competition.



HE designs submitted by ten architects in this competition were publicly exhibited in the Coventry Art School on Thursday, Friday, and Saturday of last week, and considerable local interest was shown in the exhibition. The assessor, Mr. Charles Barry, has awarded the first place and premium of 150*l.* to Mr. H. Quick, of Coventry; the second premium of 50*l.* to Mr. H. T. Hare, of London; and the third premium of 50*l.* to Mr. H. W. Chattaway, of Coventry; and the following architects completed the moderate list of competitors, Messrs. Unsworth & Newberry, Spalding & Cross, Gibson & Russell, Gordon & Wilkinson, and Mr. Charles Bell, of London; Messrs. G. & J. Steane, of Coventry; and Mr. W. J. Morley, of Bradford. The instructions issued to competitors gave considerable scope for the ingenuity of the architect; sizes of apartments were with a few exceptions omitted entirely, and the limit of cost was not stated. The departments for which accommodation had to be provided were as follows:—The City Council and Mayor's room, the offices of the Town Clerk, the City Surveyor, and the City Accountant, the Health offices and Weights and Measures offices, the Gas department, the Waterworks department, complete accommodation for the Police Magistrate's court, Magistrate's rooms and offices in connexion with them, the City Police, the City Fire Brigade, caretaker's apartments, and such extra rooms as space permitted. The instructions contained a strong expression of opinion that the buildings should be designed in blocks, so that the erection of the whole building at one time need not be a necessity. Beyond a general clause calling attention to the important subject of ancient lights, no attempt was made to indicate these upon the plan provided.

The site is a peculiar one, roughly speaking of L shape, the back of the L extending along Bailey-lane with St. Mary's Hall, occupying the centre of it, and having St. Michael's Church immediately opposite. The base of the L occupies the whole of St. Mary-street, and gives a frontage of about 250 ft. This gives a small frontage of about 87 ft. in Earl-street,

and to this street the instructions allotted the principal entrance and frontage. Another frontage of about 80 ft. faces Hay-lane. A Baptist chapel at the corner of Hay-lane and Bailey-lane cuts into the back of the L shape, and extends to within a few feet of St. Mary's Hall. The difficulties of procuring a better site are not known to us, but the site chosen appears ill-suited to a municipal building worthy of such a town as Coventry, and in years to come it will, without doubt, be regretted that a good building, such as the chosen design promises, should have been relegated to such an unsuitable position as Earl- and St. Mary-streets provide. The suitable arrangement of the new buildings surrounding such a Gothic building as St. Mary's Hall has been the crux of the whole design, and the solution of this problem has been accomplished with success only by the design placed first.

To those who are familiar with the architectural illustrations of the day, the contemplation of the drawings placed first gives rise to feelings of pleasure mixed with painful surprise that the style of drawing which is so familiar to architects in the Academy exhibitions and in illustrations in this journal should have to masquerade under the less well-known name of Mr. H. Quick, of Coventry, and a more careful examination of the design as regards plan and elevation gives a firm belief that the design is more or less the work of one, not two, minds, and we look in vain for the second name as the author of a design so full of merit. Mr. Quick's design, for so it is labelled, and thus we unwillingly must call it, is in every particular many degrees better than any of the other competitors' designs, and there is no difficulty whatever in endorsing the assessor's award as regards the first place. Simplicity of plan, suitable disposition of the different departments, and artistic sympathy for the Gothic beauties of St. Mary's Hall, coupled with very graceful elevations, in a fine rendering of Late Gothic, are the leading characteristics of this design. Mr. Quick has placed a square tower at the corner of Earl-street and St. Mary-street, and the principal entrance in the centre of the Earl-street frontage. The St. Mary-street frontage is less elaborate, whilst the Bailey-lane frontage is brought into harmony with the Gothic frontage of St. Mary's Hall. The main entrance leads into a spacious hall from which a straight corridor, parallel to St. Mary-street, is reached. This terminates

in a cross corridor, parallel to Bailey-lane, with an entrance from St. Mary-street at one end, and the entrance-hall and grand staircase to the Council Rooms on the first floor at the other. This entrance-hall is approached through the existing vaulted gateway of the old hall, and is designed as a fitting approach both to St. Mary's Hall, often used for entertainments, and to the Council Rooms. The position occupied by the Council Chamber, the Mayor's Parlour, and the Committee Rooms in this design, at the corner of Bailey-lane and St. Mary-street appears to be a very strong point, for not only are these rooms in the quietest position on the site facing St. Michael's Church, but they are accessible from St. Mary's Hall, so that, when occasion requires it, the whole of these rooms can be used with the hall as a complete and extensive suite of rooms for entertainments. The utilisation of the old vaulted entrance is an additional attraction. The position of the Police Court is also a quiet one, with the large entrance-hall to the Earl-street frontage within reach, from which the Magistrate's room at the back of the court is approached. The court has the corridor already mentioned on its long side, and the necessary lavatory accommodation on the left side of the entrance-hall, in a convenient position. This position of the court has led to the placing of the police cells in the basement immediately under the court, with a drunkards' cell in ludicrous proximity to a drying chamber. The charge-room and property-room is also on this floor, and is reached from the drill-ground and the entrance for police and the Fire Brigade in Hay-lane. The Chief Constable's office is on the ground floor, immediately to the right of a central entrance in St. Mary-street. One of the best features in this plan is the space left around St. Mary's Hall, so that the new buildings do not appear to unduly hem in the ancient building. The Fire Brigade building is placed on the Hay-lane frontage, which is set back, and shows many characteristics of a collegiate gateway with octagonal flanking towers, one of which is designed with a special recess for the fire-escape. On each side of the gateway appear rooms for police in charge of the Fire Brigade, and over the gateway is a large Fire Brigade Committee or meeting-room. The engine-house, for four engines, is placed at the back at right-angles to Hay-lane, with the mortuary and ambulance-shed opposite. This arrangement leaves a large space at the back, which will form a drill-

yard for police and fire brigade, and at the same time throws open a better view of the west side of St. Mary's Hall. The relative positions of the remaining departments can be but briefly enumerated. On the ground floor the medical officer's rooms are placed at the corner of Earl-street and St. Mary-street, with solicitor's room, justices' clerks' room, summons offices, and witnesses' rooms along the corridor facing St. Mary-street, and with the Court on the opposite side of corridor. Beyond the Chief Constable's rooms are placed the Weights and Measures department, whilst the Gas department is placed under the Council Chamber at the corner of Bailey-lane and St. Mary-street. The apartments on the first floor are reached by a convenient staircase on the left of the Earl-street entrance-hall, and here are placed the Water department offices, facing Earl-street, with the City Accountant's rooms at the corner of building. The City Surveyor and Town Clerk's offices face St. Mary-street. The basement planning is not so well thought out as it might be, and, though a good light will be obtained in most rooms, the caretaker's apartments seem very badly lighted, and no part of the windows, as far as could be seen, would appear above the ground-level. Minor defects such as these exist in one or two other instances, but the design is well schemed in its main lines, and has been worked out with much ability.

Mr. H. T. Hare's plans receive the second place and premium. It is always a pleasure to examine Mr. Hare's work, as it is invariably carefully done, with a good plan to uphold graceful elevations, but in this instance the general disposition of departments is not quite happy. The Council-chamber and Committee-rooms on the Earl-street front of the first floor entirely precludes the use of these occasionally in conjunction with St. Mary's Hall, whilst this street is narrow and has more noisy traffic than any of the other surrounding streets. Again, the police-court is placed in a police-block in Hay-lane, and the provision of accommodation for the police and their departments makes the block inconveniently large for this part of the site, and in consequence the buildings crowd upon St. Mary's Hall. A large police and fire brigade drill-yard is on the east side of St. Mary's Hall, and this is approached from St. Mary-street by an arched gateway. No successful attempt seems to have been made to combine St. Mary's Hall buildings with the new buildings in a useful way, beyond the insertion of two doorways to the corridors on the ground and first floors. The elevations, which are conspicuous by the absence of the inevitable tower, are exceedingly good, and are distinguished by the happy proportions which usually mark Mr. Hare's work. The Bailey-lane frontage is not adapted to any extent to the Gothic work of St. Mary's Hall.

Mr. H. W. Chattaway, of Coventry, secures the third premium with a creditable design, of which one of the distinguishing features is the retention of the Justice's Room, and a large portion of the block at the corner of Bailey-lane and St. Mary-street, and another the removal of the police station in St. Mary-street, and the erection of fire brigade quarters in its place. Mr. Chattaway places his Council Chamber on the first floor in the Earl-street front, and his police court occupies a position facing Hay-lane. In addition there are then a police block in Hay-lane, and a municipal block in Cecil-street and St. Mary-street, and these are connected by a long corridor behind St. Mary's Hall. Both the Court and the Council Chamber occupy rather noisy positions, whilst the arrangement of the cells on the first and ground-floors does not appear to be a good one, and the planning of the whole of the police block is unsatisfactory, with corridors both indirect and tortuous. The municipal block is shown to have a central corridor, with offices on both sides, which is lighted partly from the grand staircase. The elevations are not very striking in their design, the question of por-

portion is not happily treated in every respect. The idea of this design seems to have been to carry out the suggestion made in the instructions to erect the buildings in blocks at different times, and this no doubt is commendable, but we doubt whether the design is particularly entitled to the third premium.

Messrs. Unsworth & Newberry submit a good design in which the points are well worked out, though not quite so satisfactorily as in Mr. Quick's drawings. The main corridors occupy almost exactly the same position as those in Mr. Quick's plan, and an attempt is made to bring the Council, chamber and Committee-rooms into proximity with St. Mary's Hall. The buildings around the Hall do not materially crowd in upon it except at the back. The old entrance gateway is again utilised, with a grand staircase, serving as an approach to the Council Chamber and Committee-rooms. The Council Chamber has a position allotted to it at the back of the St. Mary's-street frontage, and is thus at some distance from St. Mary's Hall, though it is planned to be served from the same staircase. The Police Court is placed at the back of the Hay-lane block, but the Magistrates' room and the cells appear to be a great distance from the Court. The simplicity of the elevations is too pronounced, but there are many excellent features in the plan of this design.

Messrs. Gibson & Russell make a distinct departure in their plan by placing the Police Court on the Bailey-lane frontage, and in close proximity to St. Mary's Hall. The Council Chamber is at the corner of Earl-street on the first floor, whilst the Hay-lane frontage is occupied by the Fire Brigade station, with a drill-yard behind. We do not admire the florid character of the Gothic elevations, though this appears less pronounced in the geometric elevations than in the perspective.

Messrs. Spalding & Cross are represented by a Renaissance design which is entirely out of harmony with the Gothic of St. Mary's Hall. The Council Chamber is placed at the corner of Earl-street, whilst the Police Court has a secluded position at the back of the Hay-lane police block, and almost adjoins St. Mary's Hall. No attempt is made to incorporate the old building with the new.

The remaining designs are not characterised by any developments of sufficient importance to extend this article. The only comment we have to make upon the award refers to the third premium, which might well have been allotted Messrs. Unsworth & Newberry. We may add that the assessor estimated the cost of the design placed first at about 37,000/.

ARCHITECTURAL MODELLING.

BY MR. E. S. PRIOR.

THE architectural model is not recommended to the profession as a new device for client-getting. In that game of catch and hold the shifts are already sufficiently dexterous and the art of pretty sketching is quite perfect enough for all purposes. No doubt the empiric eye might sometimes be caught by the doll's-house *naïveté* of a model, but the method of its presentation can hardly compete with the *finesse* of the draughtsman, or attain to his easy delusiveness; it must be coarse and frank in comparison, and it is too laborious. A sketch is an hour or so's work; but what if clients will expect to have models made for their approval before they consent to employ and pay? What a prospect! Are modelling clerks—Gothic, Classic, and Queen Anne—to be added to the already somewhat bloated establishment of a well-staffed office? The last straw will break the back, and the professional game never be worth its candle!

And, besides, a model is too tell-tale. It is really dangerous to show what is so near the truth. It is hinted

that the beauties of many an "architectural" design have reached consumption owing entirely to the fortunate obtuseness of clients in understanding drawings. They would never have been permitted had the model revealed them. These misgivings are sound, and the craft of the draughtsman must not be brought to naught by the cult of the model.

But there need be no apprehension: the ease of the old methods is surely too pronounced for competition. There can be no question that the well-established flourish of plans, elevations, sections, and perspective will best secure from the client the consent of silence for an architect's design, and lead on to the pleasant hallucination—surely one of nature's providences for architects—that he, the client, knew all about what was going to be built for him, and indeed, had suggested it all himself. A model is a doubtful experiment; it may provoke criticism, and the game be up.

These drawbacks must be admitted; architectural modelling can never be trusted to "butter" professional "parsnips." But I gladly turn from the question of pleasing clients to the architect's vocation of pleasing himself, wherein, in my view, his title to be an artist lies. I am aware this self-pleasing of the artist is sometimes called self-denial. Froude speaks of the painter: "The upward sweep of excellence is proportioned with strictest accuracy to his oblivion of the self which is ascending." But moral self-denial is conscious; whereas the artist's oblivion of self is unconscious and imperative; if it attains morality it has become affectation, and is barren.

But as an exercise in this unconscious morality or imperative selfishness—which ever it is—may not architectural modelling be of use under present conditions. For the artist to make what he designs is surely the best guarantee that he is in sympathy with, and is pleasing himself with, his work. But present habits set a wide gulf between the architect's hands and the handiworks that are called his. Since this gulf is to be bridged by drawings, the architect should be sure of them, and know whither his bridge is leading. Sad to say, however, it is not only clients that drawings deceive; very often they prove false to the draughtsman that drew them. The bridge conveys ideas which were never intended, and which, once received into the iron mill of a building contract, are past recall. The architect made the drawings, and he must accept the product, however repugnant to his idea. There are many effects (not the "beauties" above-mentioned) which it is to be hoped neither client nor architect knowingly permitted; that both alike were unconscious of their possibility until the inexorable building exposed them. We have the most accomplished exponent of architectural design standing convicted of a *bêtise* that seems incredible. Another as perfect and practical a builder as modern architect can be, is credited with construction that a child building in bricks would have avoided; and a third, whose hobby is to show in his works that architecture must be the logical exposition of everyday needs, discovers a want of transparency in his brick walls that turns a ground-floor into a dungeon. The architectural "Palinurus has nodded at the helm," lulled by a deceitful faith in his own drawings. When a lifelong experience is not proof against the speciousness of paper, well may clients be excused for their inability to see all round plans, sections, and elevations, and know what a builder would build from them.

Some sensitive architects are said never to go near their buildings—they are afraid of what they shall see! It is to such I would specially recommend architectural modelling as giving them a review of their work, before the imprimatur of the builder is set upon it. If a dignified remoteness from the ostensible outcome of his pains and energies is necessary for the architect of our day, let him at any rate in his seclusion make the best effort



Sketch of Mr. Prior's Model in the Royal Academy.

he can at reality in his work, that it may not always be all paper to him.

In fact the evident bane of most of our serious architecture is its saturation with the ideals more of the draughtsman than the modeller. It is continually forgotten that an architectural design is a sculpture in the round. Our age is, perhaps, not the first that has pegged a veneer of stylish design on one side of a building, and let the other three expose themselves in formless nakedness; but in no other surely has this been done so unnecessarily and so shamelessly. Our serious architects have had usually sufficient curiosity to peep round the corners; but, even so, do we not often see a carefully-designed building of four façades but no "silhouette?"

The same absorption in paper is responsible for much of the architecture of "pretty bits." A drawing helps a sort of composition which a model would discourage, and which the reality of building has justly discredited. The architect who models may possibly avoid the intensity of feature that blank paper provokes. But where is the draughtsman who can escape the feeling that his drawing-sheet must be made pretty, even at hazard to his building?

Again, the habit of the T-square is responsible for much more than we think. Our façades grin at one another with a constant parallelism. We may not, perhaps, emulate the conscientiousness of the old practitioner who for forty years ruled the chimney-stacks of his elevations—whatever their purpose or position—to an exact and even level. Yet the tyranny of our drawing-instruments is insistent, attested by extravagance of revolt as much as by the dead-level of slavery. A building of the last century is troublesome to put on paper quite accurately; its seeming regularities are found by measurement to be really irregular,* and to repudiate the exact portrayal of our drawing-squares. It has, in fact, an ease and life that speak of growth, and not of drawings and contracts—a charm which our perfections of instrument constantly deny to us. But a designer modelling instead of drawing his architecture might regain the sense of ease, and pass it on to his building, and his model could be made "of the contract" as easily as drawings are.

Our plans and elevations, too, each on separate sheets of paper, do not grow up coherently from the ground. Often the plan is definitely designed, and an elevation affixed as an after-thought. Practice may make this a skilful piece of juggling, but imagination is apt to halt, and then plan and elevation, alike perfect in themselves, discover woful misfits when brought together. They have to be cobbled, to the detriment of each, whereas, if modelled first, the design would have had unity of plan and elevation impressed on it from the first.

But, greatest loss of all, architectural

drawing has no sense of material, either in colour or texture, but must needs fall back on the specification to help out the crude ideas, which are the most it can attempt. It thereby gives no encouragement to design in some of the most effective possibilities of architecture. It is as if a painter had to execute his creations by a written register of his pigments. Turner did something of the kind in his memoranda from nature, but then it was Turner who painted his pictures therefrom. The architect merely prescribes, and hopes his prescriptions will be understood; another paints his picture. How can the delicate inspirations, that come of personal feeling in such matters as texture and colour, be expected from such methods? The astounding atrocities of our streets and villages are surely the outcome of this architect-method of ours reflected and deepened in the perceptions of vulgarity. Were he to model his work, the artist could not remain insensitive to colour and texture of material, and I believe only in such a way could the effects of a master be rendered for reproduction. If architectural modelling became a part of architectural training, a great step would be taken towards leading the student to consider what a part material has to play in the effect of his designs. We might even hope for a modern building of a less ex-cruciating crudity; for walls which might be new, and yet not eyesores, that only age and obliteration can make tolerable.

What has been said gives good ground, I hope, for a use of architectural modelling, not as a show or a dexterity, but as a means of education, bringing a gain to the architect in the pursuit of his art. My meagre practice at it has suggested only a few very obvious, practical hints. For sketch models the French putty—really, I believe, an impure soap—is extremely easy of use; it can be coloured to a certain extent by powders, and, when smeared on cardboard, readily takes the form of architectural surfaces. It is, however, too soft for anything but trial work and temporary shapings of form. Rough-surfaced cardboard and the corrugated paper used for wrapping bottles have very closely the relative "values" of wall and roof surfaces respectively, and water-colour can give them suggestive tints; but, of course, anything of real texture in these materials is impossible, though they make very pleasant sketchy models. For real interpretative work wax seems indispensable, as taking and keeping both colour and texture with permanence. Ordinary beeswax is cheap enough, but is usually too dark for the light tints of stone and brick; for these get paraffin-wax and melt it up with Venice turpentine. Powdered colour will give any tint, and any required texture is got by the mixture of suitable ingredients—sands, dusts, or powders. I have used all kinds—useful for different purposes—such as amber and meerschaum dust, "bird sand," and the groceries—semolina and rizin

among others. Ground rice is indispensable for getting a fine granulated surface, and powdered chalk and mustard for a silky ditto. Anything handy may be used as a modelling tool, but the fingers with hearth-stone and marble chips will do most things. The wax adheres very readily to pasteboard, and by a thin layer of it run from a spoon, the surfaces of walling can be quickly rendered. The desired texture and arrangement of such walling could, I believe, be better explained to a mason by this method than by any drawing, and almost as surely as by building a wall for him to copy.

But here, as in all other representation that aims at conveying feeling to oneself rather than facts to another, an interpretative treatment is better than an imitative, and the use of wax is but a door to experiment. The model brings the architect a step nearer his work than the drawing did, but still it does not ground him on the building where he should be placed. There, however, the "progress" of our habits declares he shall not be. Perhaps that "progress" will go a little further, and the surgeon next will be warned off his own surgery, and the actual cutting done according to specification and by contract. The serious practitioner will then, I believe, always prepare a wax model of the case, that his cutter may see what his contract is; he will be loth to trust the success of the operation to drawings, plans, and specifications. E. S. P.

NOTES.



CORRESPONDENT In another column draws attention to the bad character of the designs for the large and otherwise valuable pieces of plate often given as racing prizes, and encloses an engraving of the particular cup referred to (the Manchester Cup of this year), which is certainly a very commonplace design, but we can assure our correspondent that we have seen many much worse than that. In the one referred to there is at least an attempt to keep the design within decorative conventional lines, although it shows an entire ignoring of scale in the details. The worst vice of many of these "cup" designs is that they entirely ignore decorative composition, and present irregular realistic conglomerations of objects of nature, without any "design" at all in the proper sense of the word. These large and costly pieces of plate offer splendid opportunities for the production of really beautiful works; and if the committees who are concerned in arranging the prizes for yacht-races and horse-races would only make a practice of going to an artist of reputation to make the design in the first instance, and then get it carried out by the tradesman, instead of merely giving an order to a firm of silversmiths and leaving the design (?) to them, English racing prizes might present a series of beautiful works of art, instead of being, as they generally are, things which all artists must hold in contempt. The same reflection occurs in regard to the presents of jewellery given at the Princess Hélène's wedding, a number of which are engraved in an illustrated paper, and are referred to by another correspondent in our present issue. Not one of these has the slightest artistic merit; they are mere shop commonplaces, worth nothing except for the commercial value of the materials employed in them. It might have been hoped that the class of English people from whom these presents mostly came would have some desire to give things less commonplace than these; but upper and middle classes in this country seem alike indifferent as to the artistic element in works of plate or jewellery; let them look sufficiently rich and costly, and that is all that is demanded.

ANY movement having for its aim the promotion of harmony between employers and employed readily commands

* That is to say, it is inaccurately set out on the ground. But is that any advantage?—Ed.

public sympathy and support; but the methods adopted are not, unfortunately, always calculated to retain that sympathy or to secure the desired end. Great things might be expected from such an organisation as the Industrial Union of Employers and Employed. The very title breathes tolerance, forbearance, and conciliation; but the proceedings at the "Inaugural Conference" of the Union, held in London last Saturday, were, to say the least, strikingly out of harmony with these desirable virtues. The invited delegates included three members of the Free Labour Association, and before the business of the meeting commenced, the Chairman was notified that their presence was objected to by the representatives of the labour organisations, and the first resolution submitted to the meeting was that they should be directed to withdraw. The Chairman was Mr. Whitwell, of Stockton, who is the President of the North of England Conciliation and Arbitration Board for the manufactured iron and steel trades; and in spite of his warning that the very element of conciliation was being endangered, the motion was carried. A suggestion was made that the unwelcome delegates should be allowed to remain on condition that they took no part in the proceedings, but they very naturally declined to agree to this, explaining that they attended by special invitation, and were willing to have done all they could to help the Conference. There is something so entirely opposed to English fair-play about this—minorities being usually treated with some degree of tolerance, if not respect—that the proceedings of the Industrial Union cannot but be regarded as both reprehensible and injudicious.

THE London County Council had a somewhat odd discussion, on Tuesday, on a report from the Finance Committee in regard to artisans' dwellings. One paragraph of that report was to the effect that when the Council erected and let these dwellings, they should not charge a higher rate of rent than that ruling in the neighbourhood. A member moved to omit the clause, on the ground that the ruling rents would not recoup the Council. But it is obvious that workmen will not live in a dwelling the rent of which is higher than that of other buildings in the vicinity, so that the recommendation of the Finance Committee was a useless formality, and the amendment equally immaterial. One thing appears clear from the discussion, that is, that the Council have on their hands vacant land on which by law artisans' dwellings must be erected, that private persons will not take the land for the purpose, and that, if the Council erect their own buildings, they cannot be made to pay. The result, of course, is that the loss must fall on the ratepayers. What may be the loss which the ratepayers now bear we know not, but we are inclined to think that the Council would best consult the interest of the metropolis if they were to have some kind of an independent inquiry into the matter with a view to discover what the loss may be, and whether it cannot be recouped in some way or other. The misfortune of bad management by municipalities is that it causes a constant and increasing drain on the ratepayers' pockets, whereas the same mismanagement on the part of a private individual must sooner or later come to an end.

LONDON possesses great advantages over Berlin in being built on soil which makes an underground railway system practicable. In Berlin we only need to dig some 2 ft. to come to surface water, so that a network of elevated electric railways seems the only means of preventing the increase of street traffic from crippling the life and stopping the extension of the city. The great engineer von Siemens felt this acutely, and considered that the site of Berlin could hardly have been worse chosen. The Municipal Authorities have this year concluded their agreement with Messrs. Siemens and

Halske to construct an electric overhead railway, nearly twenty years after Siemens first proposed it. The only reason we can see for the sudden favour into which electric traction for overhead railways has sprung is the great success of the Liverpool Railway, a line planned and constructed entirely by English engineers, who borrowed nothing from American or Continental practice.

THE new number of the *Classical Review* (June), is rich in brilliant articles. Special mention must be made of an important contribution by Dr. Furtwängler, dealing, in great part, with the Parthenon Sculptures. The article is in answer to a review of Dr. Furtwängler's book (English edition), but it deserves the careful attention of every archaeological and classical student, as it deals in detail with the interpretation of the central slab of the East frieze. Dr. Curtius, it will be remembered, advanced the entirely novel theory that the piece of drapery was neither the peplos, nor a priest's garment, but a carpet to be spread before the twelve seated Olympians. He was led to this view by the famous Magnesian inscription in which *σπουδαί* were mentioned in connexion with a festival in which the figures of the twelve gods were brought out and placed in a *tholos*. Dr. Furtwängler, who holds the old view that the drapery is the peplos, objects that *σπουδαί* cannot mean carpets, but must mean couches, *strati lecti*. The whole question is too long and too literary for discussion here, but the paper deserves full attention. In the same number is a brilliant interpretation of the long-vexed problem of the Ixion vase in the British Museum, by Mr. Cecil Smith.

THE carved work submitted for the prizes offered by the Carpenters' Company has been on view at their Hall this week. The work, we understand, is considered by the Committee to be above the average of work submitted on these occasions, but there appears to have been very little competition for the special objects mentioned, the majority of the work coming under the Miscellaneous Section. The carved frame, for which a silver medal has been awarded to Mr. T. Colley, and which is the most important exhibit, contains some good work, rather spoiled by the large lumps of projecting naturalistic foliage at the top, which are besides out of character with the rest of the design. Renaissance types of work prevail; among the best are a carved panel, with nymphs and scrolls of foliage, for which 17. and a certificate has been awarded to Mr. Butcher; another by Mr. Ormond, and a crisp bit of low relief carving by Mr. Rundle, consisting of scrolls with birds and insects introduced; for each of these a bronze medal has been awarded. Almost the only works which have been submitted for the special objects asked are two carved pilasters for chimney-pieces, for one of which, by Miss Bartholomew, the second prize has been given, the first prize not having been awarded. Most of the carving shows fairly good taste and is based on good models; an ambitious carved easel for a drawing-room is an exception, which aims at originality with a rather unfortunate result. It is better that good work on the model of recognised styles should be encouraged as a matter of training, rather than attempts at an ill-regulated "originality," and probably the Committee hold the same view.

THE Earl of Wemyss has addressed a letter to the *Scotsman*, which contains much more sense than the editor of that paper, from his comments on it, seems at all to perceive. The letter is a remonstrance in regard to the enormous size and the commonplace architectural character of the proposed North British Railway Hotel, the drawings of which are now on view in the Architectural Room at the Royal Academy, to the exclusion of some much better designs which have been turned out. The Earl of Wemyss quotes the opinions of Sir G. Reid, the

painter, and Mr. Young, the architect, on the bad effect which this immense erection, which he calls "a second Hankey building," will have on the scale of other buildings in Edinburgh, and on the general appearance of Princes-street. We fear they are quite right, but we do not suppose anything can or will be done.

IN our "Competitions" column is a report of the competition for a public hall at Woking, announcing that the architect is to have a commission of 2 per cent. for carrying out the work. The origin of this arrangement appears, from a newspaper report of a meeting of the Committee, to have been a consideration of the importance of economy before everything else, the chairman stating that in their own interests, as well as in those of the intending shareholders, they had thought that if they could secure a good architect for 2 per cent. instead of 5 per cent., they should do so. Accordingly, the invitation to compete was offered on these terms to four architects, two of whom, to their credit, declined. We are informed that there was also a stipulation (which seems quite in character with the rest of the proceedings) that the architect appointed should accept a portion of his commission in shares.

WE are promised a new seaside resort, situated at an equal distance from London and Paris, on the north-west coast of France, near Etaples, and to be called "Mayville," a name the compound character of which, half-English and half-French, seems to adroitly typify the equal relations of the new estate with each of the two countries. A company has been found to purchase and lay out the land, under the title "La Compagnie de Mayville." The beach is said to be very good for bathing, and the estate is well-wooded with pine-woods, most of which will be retained. According to the plan circulated, clearances are to be made in the woods for polo ground, cricket ground, gardens, &c., and a series of sites for villas are to be set apart between the woods and the sea. The place is three miles from Etaples, which is on the "Nord" railway line, and the "Nord" Railway Company propose to make a branch line with through booking to Mayville. For those who like these artificially-constructed seaside resorts, therefore, it seems that "Mayville" will be at all events very conveniently situated for access from England.

LAST week has deprived us of two painters of very different quality, both of whom will however be widely regretted. As a sea-painter Mr. Henry Moore may be said to have ranked the first among his contemporaries, if we compare him with others simply as a painter of sea and nothing else. Other painters of what the French call "marines" (a convenient word which might well be adopted into our language) have added to their scenes the interest of foreground, figures, and shipping; Mr. Moore, since the time when he took to the sea, has been content to paint the sea and nothing else, for the distant ships occasionally, and, it must be admitted, not very learnedly, put into his pictures hardly affected their character as pure studies of the colour and movement of sea-water. That a painter should have been able to render this mere portrayal of a waste of water so interesting and so real as he did, is a testimony both to his innate power of perception and to unwearied study and attention. Of late years, we believe, he had acquired the power of painting these open sea studies very rapidly, but this comparative ease of execution was not acquired without severe application. It is not generally known that Mr. Moore began work as a painter of landscape (to which he had unexpectedly returned in his picture in this year's Academy), and that the sea painting to which he owed his fame was only undertaken at a later period of his life. The name of Mr. J. E. Hodgson suggests very different associations from that

of Moore, and yet there is a link between them in the fact that certainly Mr. Hodgson's best and most interesting works were those in which he illustrated the character and personality of the English sailor, especially the man-of-war's man (a quite distinct type). His paintings were always interesting, conscientiously executed, and effective; but hardly in the first line. On the other hand, Mr. Hodgson was something more than a painter, and will be remembered with affection by all who knew him, for his dignified and gentle manners and cultivated mind.

THE *Pall Mall Gazette* of Monday last gave a political caricature founded on the well-known picture of "The Scape-goat," endorsing it "with apologies to Sir Noel Paton" (1), who apparently was regarded as the author of the original picture. Who the author is there is no need to tell our readers, but it is a curious instance of the carelessness of the daily press on artistic subjects that a picture of such world-wide reputation, the work of one of the most remarkable artists of the century, should be attributed to a popular painter of religious and moral subjects.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS:

PRESENTATION OF THE ROYAL GOLD MEDAL.

THE last ordinary meeting of this Institute for the present Session was held on Monday last at 9, Conduit-street, Mr. F. C. Penrose, M.A. (the President) in the chair.

The minutes of the last meeting having been taken as read,

The President said: The first and very agreeable duty which we have before us this evening is, as you are aware, that of handing, in Her Most Gracious Majesty's name, the Royal Gold Medal to the man of your choice. He is an architect whose works fully entitle him to receive it, and we may feel the greater pleasure in conferring the honour because the recipient is one of our own body. The Institute has so fully endorsed the recommendation of the Council that it implies a thorough appreciation by the general body of the reasons which led the Council to make that recommendation. I may therefore, perhaps, be thought to be going over ground so well known to the members who are present as to be of the nature of an unnecessary performance in recounting them. As, however, the proceedings of this evening will be reported far and wide, both in our *Journal* and in other publications, it may be desirable to mention some details which cannot but be interesting to outsiders. Mr. James Brooks, on whom Her Majesty this year confers the honour of the Royal Gold Medal, is a native of Berkshire, from the neighbourhood of Wantage. He came to London about 1847 to study for our profession, and became a pupil of the late Lewis Stride, a Fellow of this Institute. That he was a diligent worker in the office goes without saying; he also attended Professor Donaldson's classes at University College, and became in due time a student of the Royal Academy, and attended the professional lectures. He commenced practice on his own account about 1852, at first—as was natural—in a comparatively humble way, but soon established for himself the career in which he has been so much distinguished, and in which he has enriched the neighbourhood of London, and also many country districts, with some of the handsomest ecclesiastical structures which have been erected during the last thirty years. A complete list of these buildings would be very extensive, and lead me to a length far beyond what the occasion requires. I therefore select a very few from among the most striking examples, placing them approximately in the order of their dates, namely:—The Convent Schools and Chapel of St. Michael, Shoreditch, 1863; St. Margaret's, Lee, in Kent, 1876; St. Peter's, St. Leonards-on-Sea, 1883; St. Mary, Hornsea, 1888; St. John the Baptist, Kensington, 1892. It is evident that much valuable study and successful practice must have preceded the first during the ten years which date from 1852 as above mentioned. And we may hope that the last-named on the list may be succeeded by a goodly following by the same hand. The style of architecture which Mr. Brooks has chosen for the majority of his churches is either the Lancet, or else the Transition into

Curvilinear which succeeded it. In a few instances (one of them being the church at Hornsea referred to above) the Perpendicular style has been used very effectively. The treatment is invariably vigorous, and with a simplicity somewhat bordering on severity, particularly as respects the exteriors. This, however, is not the place to criticise, but to praise them, and they are worthy of it. Mr. Brooks's fame, no doubt, rests mainly on his ecclesiastical designs; but they are by no means his only achievements. Among his works may be cited a large brewery, an hotel, many secular buildings, two hospitals in connexion with sisterhoods, extensive and sumptuous stables built for the Marquis of Londonderry, labourers' cottages, and gentlemen's mansions, one of the most remarkable of these being in South Africa. Mr. Brooks is Architect to the Diocesan Society of Canterbury, and is one of the consulting architects to the Incorporated Society for Building Churches. Lastly, I feel sure of having your united concurrence with me in the act of handing to our distinguished colleague this Royal recognition of his merits as an architect.

The President then presented the Royal Gold Medal to Mr. Brooks, amidst the applause of the meeting.

Mr. James Brooks said that he first wished to be allowed to express his gratitude to the President, for the kind but too flattering remarks he had made on himself and his works as an architect when presenting him with the Royal Gold Medal. The honour was also enhanced by its having been given, on the recommendation of his brother architects, Members of the Institute. The medal was annually conferred on architects and men of letters, and was wisely not confined to Englishmen. He felt most keenly his position that evening, in having to address his fellow architects on receiving the medal, for he, unfortunately, was not an orator. His mind went back to those distinguished men, who in the past had filled the position he occupied that evening. He could mention name after name, but he did not wish to be invidious, although he felt as deeply as they could the honour which had been conferred upon him, and which would cause him to strive even more faithfully to do his work as an architect, and to leave marks of history behind him, which should not be entirely to the disgrace of the person who had left them. An architect was not like a painter: the architect's buildings stood out in their goodness or badness, and more often the latter than the former. They stood before the whole world and made history, while the painter's pictures went into the picture-galleries and other places, and were more hidden from the eye. Architects then had a duty to perform, namely, to endeavour, as far as lay in their power, to hand down their works in their humble way, as he only could hope to do, and to imitate in some slight degree those great Masters who had left behind them such monuments of their skill and ability. He referred to such men as those who had designed Durham Cathedral and Christ Church, Hampshire, both built by the same architect. When he looked at those works, and studied those buildings, as he had studied Durham Cathedral and Christ Church, Lincoln, Ely, Salisbury, Hereford, Winchester, and other great buildings, as well as the great collegiate churches—which to their great regret were mostly in ruins—not to speak of the parish churches great and small, and then looked at his own poor efforts as an architect, he had felt what a gulf existed between those works and his. He could attribute many of his shortcomings to the little amount of training which existed in his time. It was true that he had at a very early age a love of invention. He could give some of his efforts in that direction, and to mention one he might say that when his father first presented him a watch he was proud and contented, but he soon got tired of looking at the outside. Wishing to see the inside, he soon found out a way to take the watch to pieces, although he found it was not an easy thing to put it together again. Not to be daunted, however, he discovered the way to do this, and from that time he regularly did the cleaning. Without the gift of invention he would ask how could a man become an architect, as the architect's works ought to be full of invention. Even where there was this natural gift, it could not be fruitful without systematic training and study. In his early days this great advantage did not exist. No doubt they had Professor Donaldson's lectures then, but he could not see that these gave them such insight into the complete knowledge of their art as was necessary. The Institute, however, was now offering to all young men who chose to avail themselves of it the curriculum presented for their guidance and

teaching, so that they might become much more accomplished architects than they possibly could if they had to come into their sphere of life in a sort of "tumble-up way." The Examination had been now divided into three classes: first, the Preliminary; secondly, the Intermediate; and third, the Final. He did not wish to be misunderstood on this point, for he was not going to say that the Examination was going to make men who had not got the genius of architects capable architects. He was quite aware that anyone might pass these examinations, but they would not qualify such a man to become an architect. It was merely the means to an end; it was only the foundation and not the superstructure. If the student did not possess the natural genius requisite, no examination could impart it to him. But to those who went through this systematic training which the Institute supplied, it facilitated the acquiring of such knowledge as an architect should possess, before he could with any success enter upon his calling. No one reaped these advantages so fully as the natural born genius, for it enabled him to obtain in a much shorter time the completion of his studies, and to make an earlier start in life on his own account than he otherwise would. By this training and the examinations the student felt some confidence in himself, and this was a great advantage over the "tumble-up way" he had to pursue in gaining the small amount of the art and science of architecture that he possessed. He was proud to receive so great an honour as the Royal Gold Medal, after the long list of medalists who had received it in former years, and of whom he was the last and the least. He had also been gratified to receive many letters from noblemen, gentlemen, and members of the Institute, which would render the medal even more valuable in his sight. At all times he had endeavoured to do his duty; he had loved his profession, and had striven hard for it. This was not the only time he had received the favour of the Institute. He had, through their very great kindness, been elected year by year to the Council, although he thought it was time for him to retire, and allow some other person to occupy his position (cries of "No"). For four years in succession they had honoured him by electing him one of the Vice-Presidents of the Institute, and the medal which now hung round his neck was the last honour which they had conferred upon him. He was grateful to them for listening to a man who was not an orator, and who could only say things in a common way, but he had strong feelings, because he loved the art which he had been practising for so many years. He had been endeavouring to impress on the works that he had been carrying out for years some little originality, to show that there was some individuality in the man who had erected them. He would conclude by returning grateful thanks for their kindness in conferring this great honour upon him.

The President added that after the most interesting speech they had heard from Mr. Brooks, according to the programme there would have been a special general meeting, but as ladies were present, who were not expected to take part in their ordinary routine discussions, they had thought it better that the special meeting should be adjourned to that day fortnight. There would, therefore, be no further discussion that evening on the point referred to in the printed notice.

The meeting was adjourned accordingly, and the proceedings then terminated.

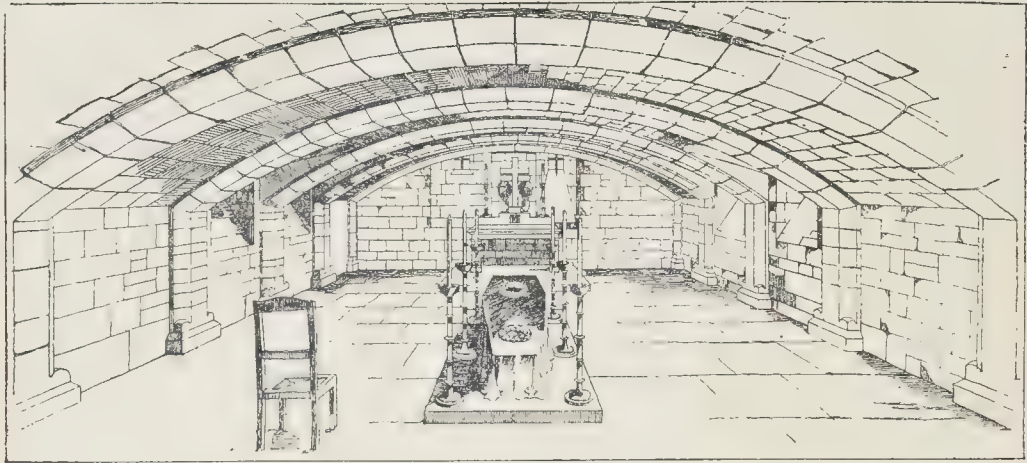
THE CONGRESS OF FRENCH ARCHITECTS.*

THE morning of Wednesday, June 12, was occupied by an excursion to Saint-Emilion, taking Montagne and Château Saint-Georges *en route*.

Quitting the train at Libourne, the excursionists went in carriages to Montagne, to visit the church, dating from the twelfth century, and which forms an important opportunity for the study of the supposed influence of the cupola on the origin of Gothic architecture. M. Bruttails, the "archiviste" for the Department of the Gironde, and M. Corroyer, Inspecteur-Général of Diocesan Buildings, entered into an animated discussion in regard to the vaulting of this church. According to M. Corroyer, the vault at Montagne marks an important step in the evolution of the vault from the cupola form;† while M. Bruttails entirely refused to believe that the Gothic system of

* Concluded from last issue.

† M. Corroyer's views on this subject have already been considered in the *Builder*, in the course of a review of his book on Gothic architecture in our issue of January 23, 1893.



The Crypt, St. Bartholomew-the-Great, Smithfield.—Opened this week as a Mortuary Chapel.

vaulting-ribs could have originated in any sense from the pendentive of the cupola, from which it differs so much in form, structure, and architectonic function.

At the Château of Saint-Georges the proprietor, M. Desbois, did the honours of his residence, built at the end of the last century by Victor Louis, architect of the theatre at Bordeaux, and also of the Saint-Georges vintage, which is considered equal to that of St. Emilion, the qualities of which the members had also the opportunity of discussing on arriving at the latter place. Subsequently M. Piganeau, an archaeologist residing at Saint-Emilion, conducted the party over the various architectural monuments of the town; the ramparts, towers, and gates of the twelfth century, the remains of a château of the thirteenth century, the circular chapel and square tower above the traditional grotto of Saint-Emilion, the Romanesque parish church, the cardinal's palace of the thirteenth century, and the remains of some ancient monasteries.

In the evening, from nine to half-past ten, there was a business meeting at which MM. Poupinel and Marius Faget spoke on the composition of the "Conseils Départementaux des Bâtimens Civils," and the necessity of bringing legal restriction to bear on the officials of the Government (engineers, directors of the "Ponts-et-Chaussées" department, &c.), who, M. Faget affirmed, not only exercised in their position the functions of architects, intruding into a profession to which they did not belong, but did so often in the time which they properly owed to the State and even with the assistance of the officials engaged by the State for other work, entering into a competition with practising architects which was both disloyal and illegal.

On the morning of the 13th, from half-past nine to eleven, and at an afternoon meeting from four to six, the questions of the previous evening were resumed, and also other questions relating to professional duties of architects, the creation of a "Caisse des Secours Confraternels," to public competitions, and the state of the law in relation to these subjects.

The subject of the "Caisse de Secours," recommended by M. Franz Jourdain, of Paris, gave rise to the nomination of a committee of organisation composed of seven members. A noteworthy paper by M. Guadet, in relation to the professional duties of architects, was adopted unanimously in its general scope by the meeting. In regard to the question of Departmental "Conseils des Bâtimens Civils," the following resolution proposed by M. Achille Hermant was also carried unanimously:—"That all projects of construction or restoration of buildings belonging to Communes and Departments should be submitted to the examination of the 'Commission des Bâtimens Civils' in each Department, and that the Société Centrale des Architectes should take the necessary steps to obtain this regulation from the proper authorities."

Before these two meetings the members of the Congress, in various groups, had visited, under the guidance of the architects of Bordeaux, the buildings of the Faculté de Médecine and of the Faculté des Lettres et Sciences the Hôtel de

Ville, and the churches of Saint-André, Saint-Croix, Saint-Michel, &c.

In the evening of the same day, the Congress at Bordeaux was closed by a banquet, presided over by M. Charles Garnier, the members dispersing, to meet again at Paris on Saturday, the 15th, the intervening Friday being given up to the journey. On Saturday, from half-past nine to half-past eleven, the Annual General Meeting of the "Caisse de Défense Mutuelle" was held for the reading of the annual Report by M. Charles Lucas, the secretary, and for the election of officers for the year 1895-6. The Report showed that the "Caisse de Défense" at present numbers 465 members, including those in Paris and in the allied societies in the provinces; that the work of the Association was increasing; that during the last session three actions have been gained in the courts of law, through the moral and pecuniary support of the Association; that a reserve fund of eleven thousand francs had been created; and that the balance-sheet showed a sum of about seven thousand francs to its credit. On the 17th at 3 p.m. took place the formal distribution of the prizes awarded by the "Société Centrale des Architectes," under the presidency of M. Charles Yriarte, Inspecteur des Beaux-Arts, representing the Minister of Public Instruction, assisted by M. Nicolas, Director of the Department of Commerce, M. Charles Garnier, the President of the Congress, and M. Kœmpfen, Director of the National Museums.

Among the awards it should be noted that, in addition to those given in the course of the excursions from Angers and Bordeaux, there were two new medals; one gold medal awarded to M. François Dainville, architect, of Paris, for his long and honourable professional career, and a bronze medal, given by the "Société Centrale" to the members of the syndicate of masonry contractors. We may add that the medal for archaeology (founded by the Société Centrale) has been awarded this year to M. Chédanne, for his fine studies and restoration of the Panthéon, which were recently exhibited in London, at the Institute of British Architects. At seven in the evening the final banquet took place at the Hôtel Continental, at which speeches were made by M. Yriarte, M. Charles Garnier, M. Wallon, Member of the Senate, M. Emile Trélat, Member of the Chamber of Deputies, MM. Corroyer, Roux, Boileau, and Gautier.

This brought to a close the twenty-third session of the Congress of French Architects, which has been longer, more laborious, and perhaps also more fruitful in results than its predecessors.

THE '91 ART CLUB.—This club, whose Annual Exhibition will open at the Egyptian Hall (Drawing Room) to-day (Saturday), was founded in the interest of Lady Artists, and includes among its members Miss Rose Barton, Miss Anna Nordgren, Mrs. Normand (née Henrietta Rae), Mrs. Perugini, Miss E. M. Rope, &c. We understand that Mr. Edward Freeman has this year undertaken the management of the exhibition for the club.

THE CRYPT, ST. BARTHOLOMEW-THE-GREAT, SMITHFIELD.

THIS crypt, of which a sketch is given above, is to be opened to-day (Saturday) as a mortuary chapel.

The crypt, which dates from early in the fifteenth century, has been cleared out and restored under the direction of Mr. Aston Webb. It is 25 ft. long by 23 ft. 3 in. wide, vaulted in a single span. Portions of the original vaulting-ribs were found, built of square blocks of chalk, and from these the vaulting has been restored, every trace of the original work being carefully preserved. The crypt was lighted by deeply-splayed windows, in some of which the original iron bars remained. In the south wall were three windows and one narrow door, which latter has been made use of for the present approach, by lowering the threshold so as to obtain more treadway. In the north wall there were three windows, which are still closed, as the adjoining property has not come into the possession of the Committee. In the east wall are two openings, a window on the right, and on the left a peculiar doorway, with a head 2' 6" above the level of the vaulting, but with iron hooks showing that the door had opened inwards, and it would therefore seem that it must have been in existence prior to the vaulting. The doorstep is 3 ft. 4 in. from the floor. Not to remove any remains of old work, this doorway has been filled in with masonry, which can be removed at any future time, and a glazed opening left for light.

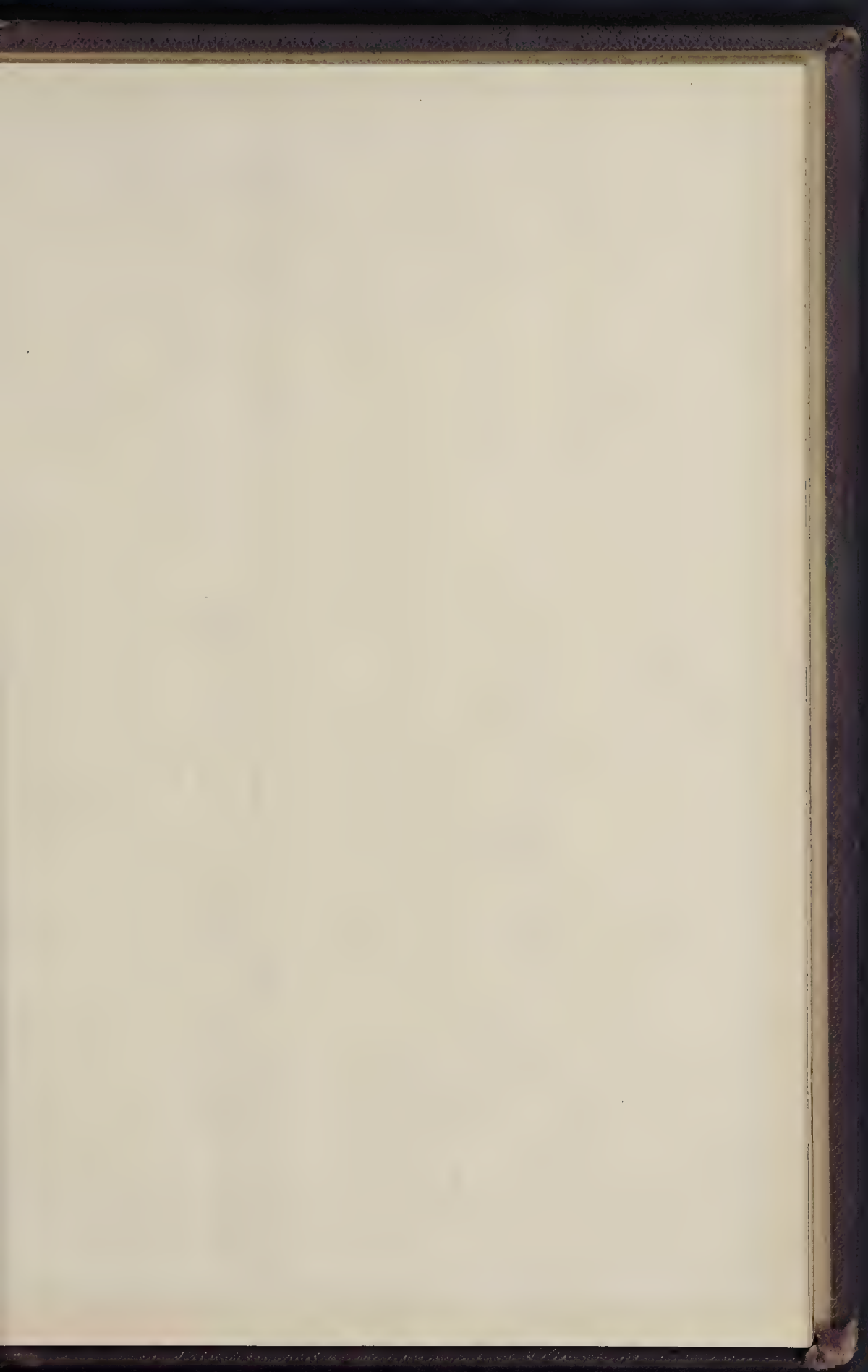
After to-day the crypt will be open to the public, on a payment of 6d.

The Committee have now been able to remove the factory buildings which occupied the remains of the Lady Chapel, and the excavation of the crypt and its utilisation as a mortuary chapel has been the first result. The restoration of the Lady Chapel and its opening for service, are the next objects of the Committee, for which, however, funds have not yet been obtained.

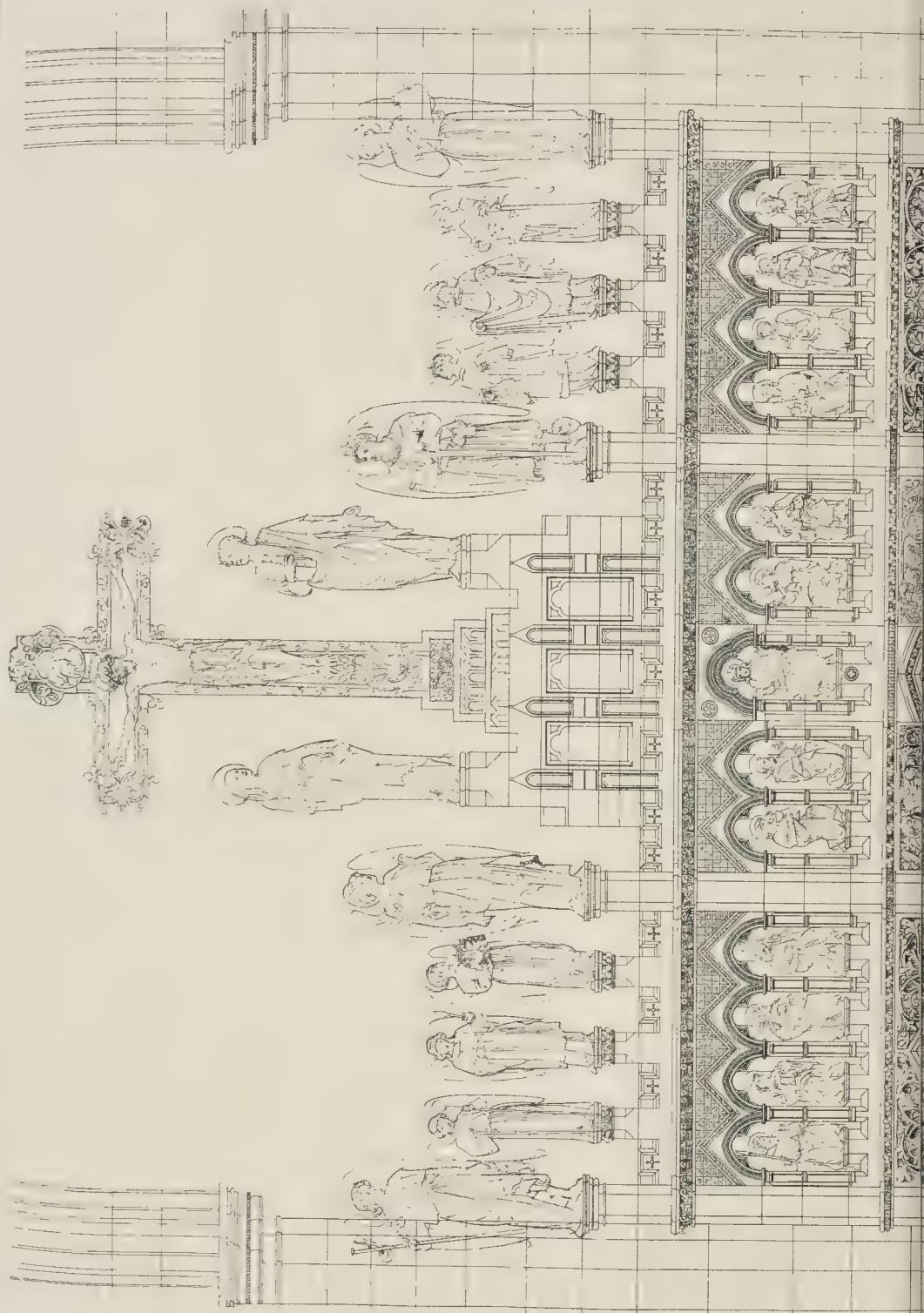
THE LONDON COUNTY COUNCIL.

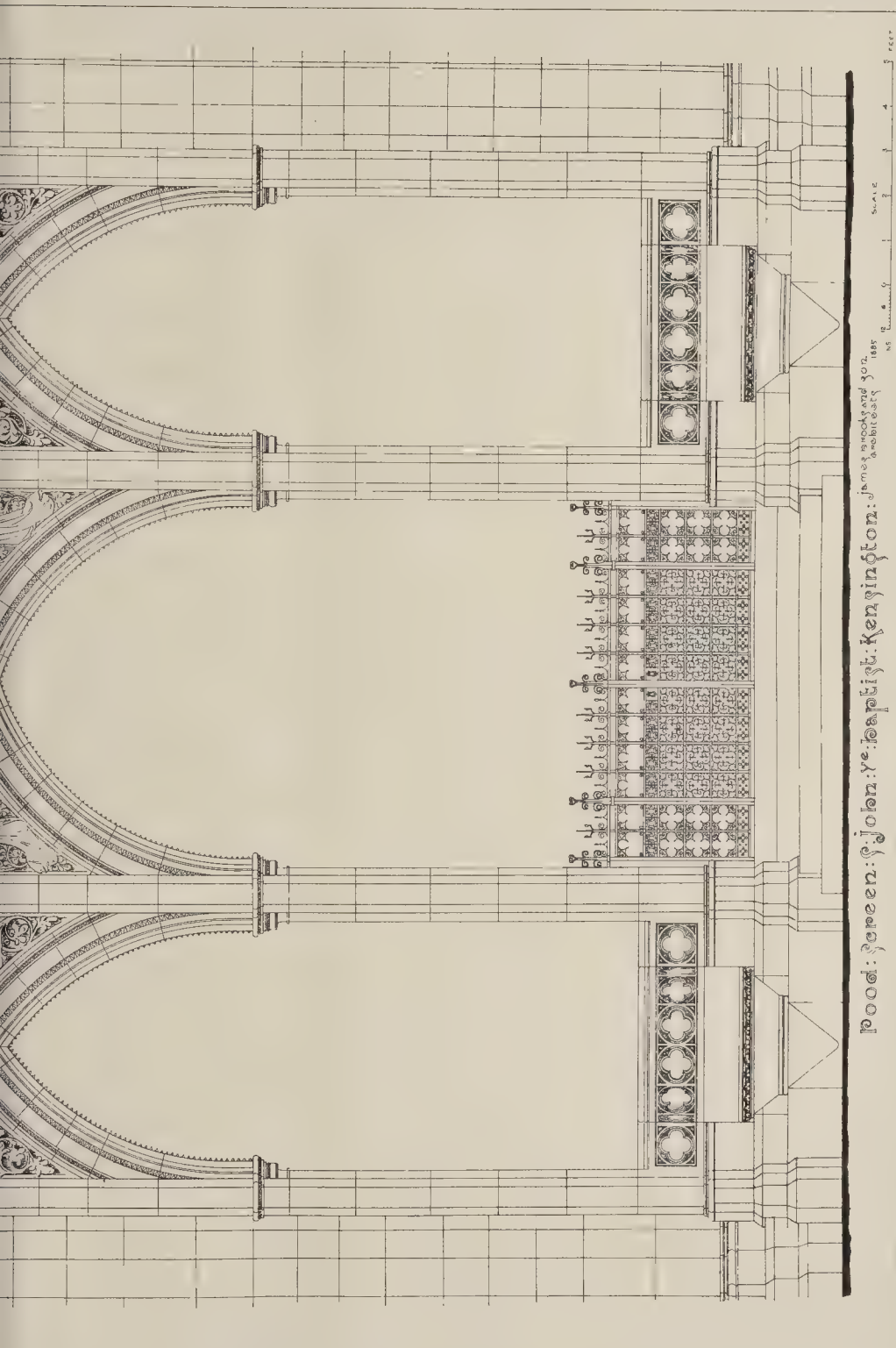
A SPECIAL meeting of the London County Council was held on Monday at the County Hall, Spring Gardens, Mr. Arthur Arnold, Chairman, presiding, to consider a report of the Parliamentary Committee in reference to the London Water (Transfer) Bills.

The Committee pointed out that last week they reported fully as to the progress made with the two Transfer Bills now before the Committee of the House of Commons, and they were then authorised to draft an alternative clause to be submitted to the Council. The Committee added that they believed the clause they submitted was in accordance with the decision of the Committee of the House of Commons, and followed the lines of the policy of the Council for the acquisition of the undertakings at the fair and reasonable value, having regard to all the circumstances of the case. They recommended "That the draft clause be tendered to the House of Commons' Committee in substitution for the provisions of the Council's Bills relating to terms of transfer."



THE BUILDER. JUNE 29, 1895.





Wood: Screen: of John: Ye: Baptists: Kennington: James Wood and Son: 1857

Woods: 1140: SPRING: & CARR: EAST: HAD: NE: STREET: LITTLE: - THE: EC

The clause submitted by the Committee was as follows:—

"And whereas (failing agreement as to sale and purchase in order to determine the fair and reasonable value of the undertaking it is intended to provide that the arbitrators should in determining such value have regard to all the circumstances of the case and should hear and consider all matters, whether past, present, or future, laid before them by either party, relating to any such circumstances, and should not be precluded by any legal objection from entertaining the same. Be it, therefore, enacted there shall be paid by the Council for the transfer of the undertaking such a sum of money as the arbitrators determine to represent the fair and reasonable value of the undertaking, together with such further sum as the arbitrators may award to meet the cost of re-investing such money (in the event of no arrangement being made by the Council under which such money may be re-invested without cost), and the arbitrators, in order to ascertain such sum, shall inquire into and consider all the circumstances of the case and the contentions of the Council and the Lambeth Company respectively, and may deal with the same in the manner in which a judge sits in their absolute and unfettered discretion think fit, on such terms and in such manner in all respects as they think fair, reasonable, and expedient, and as fully and effectually as could be done by Act of Parliament. The arbitrators may at any stage of the proceedings upon the reference to them, and with the same power as the Court or a judge, state in the form of a special case any question of law arising in the course of the reference, and any question of law so stated shall be for the determination of the Court, subject to all rights of appeal as from a judgment or order of the Court."

Mr. Whitmore, M.P., moved the following amendment:—

"That as the conditions under which the purchase of the water companies would be carried out under the proposed new clause are essentially different from those which have been sanctioned by the Council in clause 6 of the Lambeth Water Transfer Bill, the Finance Committee be directed to report upon the probable financial effect upon the rates of London of a purchase of the companies under these altered conditions; and that the Water Transfer Bills be not further proceeded with until this report has been presented to the Council."

He considered, he said, that the proposed clause was a fair one, but in his opinion, it would not be well for the Council to embark on such an undertaking without knowing what outlay would be involved.

Sir G. Lushington seconded the amendment, and after considerable discussion, there voted on a division, for the amendment 52, against, 63. A second division then took place on the recommendation of the Committee, when there voted for the recommendation 64, against, 36.

The ordinary weekly meeting took place on Tuesday, Mr. Arnold again presiding.

Dwellings for the Working Classes.—Lord Welby brought up a further report of the Finance Committee with reference to dwellings for the working classes. It recommended:—

"(1.) That, with regard to lands acquired or appropriated by the Council for the purpose of the housing of the working classes, the question of the desirability of such lands being sold or let for the erection of dwellings or of the Council itself erecting dwellings thereon be first considered by the Council. (2.) That in cases where the Council decides itself to erect dwellings in preference to selling or letting the land for that purpose:—(a) The rents to be charged for the dwellings shall not exceed those ruling in the neighbourhood, and shall be so fixed that, after providing for all outgoings, interest, and sinking fund charges, there shall be no charge on the county rate in respect of such dwellings, and that all such dwellings shall be so designed that the cost of erection may not exceed a sum which will enable the Council to carry out the foregoing conditions:—(b) Before an order is given by the Council for the erection of any dwellings (or to cause the erection of any such dwellings), the Finance Committee shall report to the Council on the estimated effect of the erection of such dwellings on the county rate. (3.) That in cases where the Council is compelled by statute to rehouse on particular sites, and is not able to sell or let those sites for the purpose of the erection of artisans' dwellings, the financial aspect of each such case shall be specially considered by the Council on a joint report by the Public Health and Housing and Finance Committees, and that where the Committees are of opinion that the particular sites are undesirable by reason of excessive cost, unsuitability, lack of demand for dwellings or other causes, they shall report to the Council on the desirability of obtaining the approval of the Secretary of State for the Home Department, or, if necessary, of Parliament to a modification of the scheme, with a view to the dwellings being erected on some other site or sites, and the original sites freed from the restrictions attaching to them."

Mr. Bond approved the course the Finance

Committee had taken, but he thought something must be done to bring a better return by charging higher rents. He moved as an amendment to (a):—

"The rent to be charged for the dwellings should be so fixed that after providing for all outgoings, interest, and sinking fund charges, there should be no charge on the county rate in respect of such dwellings."

Mr. Dixon seconded the amendment, which, however, was lost.

Mr. Charles Harrison also moved an amendment to insert after the word dwellings in Recommendation 2, paragraph (a), the words, "that the rents to be charged for dwellings shall have regard to the total sums expended by the Council and outstanding from time to time upon all the dwellings for the time being of the Council."

After some discussion, on the motion of Lord Welby, the recommendations were referred back in order that the amendment of Mr. Charles Harrison might be considered by the Committee.

The Land Transfer Bill.—This Bill was approved, and the Parliamentary Committee were asked to take the necessary steps to support it before the Select Committee.

New Entrance to Brockwell Park.—It was agreed, after some opposition, that a new entrance to Brockwell Park should be made. The Parks Committee recommended:—

"That, subject to an estimate being submitted to the Council by the Finance Committee, as required by the statute, the Council should authorise an expenditure of £1,470*l.* for constructing and draining footpaths, forming two ornamental ponds and executing works to the stream, constructing rustic bridges, shrubberies, and providing two-strand wire fencing to the paths, and boundary fencing and gates at the Arlington-road extension to Brockwell Park; that the boundary fence and gates be erected without the intervention of a contractor, and that the plans and estimates be referred to the Works Committee for that purpose, and that the remainder of the work be executed under the superintendence of the chief officer of the Parks Sub-Department."

Boundary-street Improvement Scheme.—It was also agreed, on the recommendation of the Public Health and Housing Committee:—

"That, subject to an estimate being submitted to the Council by the Finance Committee as required by the statute, the work of erecting the superstructure of the block of dwellings in Mount-street and opposite St. Philip's Church, comprised in Section 1 of the Boundary-street area, be executed by the Council without the intervention of a contractor, and that the plans, specification, and estimate be referred to the Works Committee for that purpose; but that in the event of that Committee not being satisfied of the sufficiency of the estimate, the Public Health and Housing Committee be authorised to invite tenders for the work."

Widgate-street and Sandy's-row.—It was agreed, on the recommendation of the Improvements Committee, to inform the City Commissioners of Sewers that the Council is not prepared to continue the widening of Sandy's-row as far as Artillery-passage.

Analysis of London Water.—The report of the Parliamentary Committee contained the following paragraph, the recommendation being agreed to:—

"The chemist reports that, on learning that it was not intended to offer any more evidence in support of the preamble of the Lambeth or Southwark and Vauxhall Water (Transfer) Bills, he gave notice to all the temporary assistants engaged in the analysis of water that, subject to our decision, their employment would terminate at the end of this week. The present investigation has, however, the chemist states, been productive of such important results that he advises its continuance, since evidence on the quality of the water supply will be required before the arbitrator to be appointed under the Bills. We concur in this view, but, as the continuance of the investigations is not for the purpose of evidence on the Bills, we are unable to authorise it without reporting the matter to the Council. We recommend:—

"That the chemist be authorised to continue the examination of the waters of all the companies, for a period of six months, at an expenditure of £20*l.* a month."

Millbank Prison Site.—The report of the Public Health and Housing Committee contained the following paragraph:—

"The Council will shortly be in possession of the land, about 20 acres in extent, on the Millbank prison site which it decided to acquire from the Government. It has therefore become necessary to consider what method shall be adopted for laying out the site and preparing the plans of the dwellings to be erected thereon. We have given careful consideration to the question whether the plans should be prepared by the Architect's Department of the Council or whether an outside architect should be employed for the purpose. We are of opinion that

as the Architect's Department is at present fully occupied with the preparation of plans of the buildings to be erected on the Boundary-street area and other areas under our control, the services of an outside architect should be engaged. We recommend:—

"That the Committee be authorised to employ a specially-qualified architect to design the laying out of the Millbank prison site, and to prepare the plans of the buildings to be erected thereon."

The paragraph gave rise to considerable discussion. A motion to defer the consideration of the matter having been lost, Mr. Leon moved to add the words, "or architects."

Mr. Antrobus asked if the Council would not be involved in considerable expense if either the recommendation or the amendment were agreed to.

Mr. Bruce, Chairman of the Committee, replied that if a professional man were engaged he would be paid the usual professional fee. If the work were done in the Architect's Department a much larger staff would be required than they had at present.

Mr. Leon's amendment having been seconded, was then agreed to, 29 voting for it and 25 against.

Mr. Antrobus moved to refer the matter back for further consideration. In his opinion, to seek the assistance of an outside architect was to reflect discredit upon their own Architect. If that gentleman needed more assistance in order to prepare the designs he ought to have it.

Mr. Westcott seconded.

Mr. Hoare said that he had a very high opinion of the ability of their Architect, still it was often wise to obtain outside advice, since a man could so often get into a groove, and could not avoid a sameness about his work.

Mr. John Burns said that outside help had previously been obtained on other works, and he saw no reason why that precedent should not be followed in this case.

After further discussion, the consideration of the recommendation had to be adjourned, owing to the 7 o'clock rule.

The Council soon after adjourned.

ARCHITECTURAL SOCIETIES.

BRADFORD SOCIETY OF ARCHITECTS AND SURVEYORS.—The members of this Society had their summer excursion on the 21st inst. to York. Among those present were Mr. Wheatley Smith (President), Messrs. H. Perkins and A. B. Burleigh (President and Secretary of the York Architectural Society), Messrs. T. H. Healey, Charles Gott, C. H. Hargreaves, W. B. Woodhead, B. D. Fairbank (hon. secretary), John Hindle, R. Armistead, T. C. Hope, B. Cowgill, James Young, H. Marten, J. F. Hew, Thomas Barker, C. E. Milnes, C. H. Gott, and A. G. Adkin. Luncheon was served at the Royal Station Hotel on arrival, and afterwards the party went to view the Minster, St. Mary's Abbey, and other interesting buildings. After dinner, "The Health of the Guests" was proposed by the President, and responded to by Messrs. Perkins and Burleigh. The toast of "The Ladies" was submitted by Mr. C. H. Gott, and responded to by Messrs. Armistead and Healey. A photograph of the group was taken by Mr. Burleigh in the hotel gardens.


LINCOLNSHIRE ARCHITECTURAL SOCIETY.—The members of the Lincolnshire Architectural and Archaeological Society visited on the 19th inst. a number of churches and other buildings of interest in the neighbourhood of Stamford. The Society has recently lost by death the Bishop of Nottingham (the Rev. Dr. Trollope), and the Rev. Precentor Venables, of Lincoln Cathedral, both of whom took great interest in the work of the Association. To Dr. Trollope and Precentor Venables has hitherto been entrusted the work of describing the buildings visited, and their places were filled on the 19th inst. by the Rev. Arthur Sutton, of Brant Broughton, Newark, and the Rev. Andrew Trollope, of Edithweston, Stamford. The proceedings commenced with a service in St. Mary's Church, Stamford, and afterwards the party drove to Duddington and inspected the church. Later the party visited the churches of Tuxover, Barrowden, Herringworth, Luncheon was partaken of at Lyddington, where the church was also inspected. Leaton Church was next visited, then that of Morcott, North Luffenham, Edithweston, and Empingham. Upon the arrival of the party at Stamford the annual dinner took place at the Stamford Hotel, the Mayor (Mr. J. S. Loweth, J.P.) presiding. This was followed by a public meeting in the Assembly Rooms, at which papers were read by Canon Svers (Barnack) and the Rev. A. Trollope (Edithweston).

EDINBURGH ARCHITECTURAL ASSOCIATION EXCURSION.—The members of the Edinburgh

Architectural Association, to the number of forty, went for their annual excursion on the 22nd inst. to the Island of Bute. Making an early start from the Caledonian Station, the party caught the *Columba* at Gourrock, and were landed at Rothesay at half-past ten. From this place they drove across the island to the interesting old chapel of St. Blane, which dates from the time of Malcolm Canmore, and which was described by Dr. Rowand Anderson, the leader for the day. Thereafter a visit was paid to Mount Stuart House, over which, by the kindness of the Marquis of Bute, the party were shown. The architect was Dr. Rowand Anderson. The great entrance-hall, worked out in marbles, was greatly admired. Returning to Rothesay, the party dined in the Bute Arms Hotel. Dr. Rowand Anderson, the chairman, proposed the health of the Marquis of Bute, whom he described as one of the most magnificent patrons of art in Scotland—of art in its very widest sense. Mr. Windsor Stuart, the reporter, replied. The party left Rothesay by the *Lord of the Isles*.

Illustrations.

PORTRAIT OF MR. JAS. BROOKS.

 AS has been our usual custom of late years, we give with this number, which contains the report of the meeting of the Institute of Architects, at which the Royal Gold Medal was conferred, a portrait of the Gold Medalist of the year, Mr. James Brooks, whose architectural works, in their union of simplicity and massiveness, with refined study of form and proportion, fully justify the recognition of them by the Institute, which the award of the Gold Medal implies.

The portrait is reproduced from a photograph which Mr. Brooks had taken expressly for this occasion.

CHURCH OF THE GOOD SHEPHERD, GOSPEL OAK.

LIKE the portrait of Mr. Brooks, this drawing of the interior of one of the finest of his recent churches has been specially prepared for publication in this number of the *Builder*.

The drawing, as will be seen, gives a view in the centre of the nave looking towards the east end. The effect of the development of the vaulting-ribs from a circular pier, without the interposition of any cap or impost moulding, is well shown in the drawing, and though we are not prepared to see the cap or capital discarded altogether in works in the Gothic style, there is an expression of constructive unity and simplicity in this treatment which is very satisfactory.

A plan, elevations, and description of the church will be found in the *Builder* for December 29, 1894.

SCREEN, ST. JOHN THE BAPTIST, HOLLAND ROAD, W.

THIS screen is built in Borstain stone, the figures being in Corsham. The subjects of the top figures are as follows:—The centre one, the Crucifixion, with our Lady and St. John on either side; on the four columns are the archangels; and between them are three angels holding their tapers; below the figure of the Crucifixion are the three Prophets. In the niches below the centre figure is our Lord sitting on His throne in glory, and the twelve Apostles on either side; in the four spandrels below, two have elaborate but simple carving, whilst in the other two are angels holding censers.

The whole work is lofty on account of the great height of the church. The Crucifixion is well up into the chancel arch. The gates are not fixed, they are being made at the present time; they will be in wrought-iron work, heavily gilded. An elaborate reredos has been erected in this church; the whole of the panels being filled with paintings, all of which represent the Adoration of the Lamb.

The work was carried out and erected by Mr. J. J. Wise, of Deal.

ST. JOHN'S CHURCH, CHESTER.

THIS view of the interior of the grand Norman nave of St. John's Church, Chester, is drawn by Mr. T. P. Ivison, of Chester, who has illustrated, in our pages, a good many other architectural monuments in that city.

As most of our readers are aware, the church of St. John is in a very disjointed state, the nave only being in existence in a complete state, though there are remains of the choir to the eastward of

it. The view is taken in the north aisle of the nave, and the window and reredos seen on the left are those which were built up at the modern restoration, across the space between the eastern ends of the walls remaining perfect, replacing the wall of enclosure made in the time of Elizabeth, when the fabric was in a half-ruined state, and was patched so far as to be available for service. This enclosing wall includes a portion of the ancient choir, being built about 8 ft. eastward of the east piers of the crossing.

The Church of St. John was founded by Bishop Peter, probably very shortly after the Conquest, on the site it is believed of a previously existing Saxon church. The building seems to have been completed not, as was so often the case, by horizontal addition at various dates, but by vertical addition; the triforium being Transitional in style and the clearstory Early English, the architectural styles thus following each other in successive layers of building. A portion of the triforium arcade is shown in Mr. Ivison's drawing; the remainder of the view embraces, with the exception of the end enclosing wall, only the first Norman work.

THE BRUSHLESS PAINTER.

A LARGE party of gentlemen proceeded from London to Cardiff last Monday to inspect some trials about to be made with the new "Brushless Painter," or Cleaver's Pneumatic Painting Machine. The invention consists in the paint or other liquid being applied to the surface to be coated in an atomised condition by the action of an air-blast, the paint or other liquid being, for this purpose, contained in a closed vessel, into which air is pumped, whereby the paint is forced through a tube at a rate dependent on the pressure of the air supplied to the vessel. To the end of this paint-tube is attached the "nozzle," which is fitted with a V-shaped adjusting-plate, and the stream of paint is here met by a blast of air supplied direct from the air-pump through a flexible steel tube, whereby the stream is pulverised and projected on to the surface in the form of a spray; both the stream of paint and the air being under the control of a regulating valve, the blast being produced by a hand-operated air-pump or compressor provided with a reservoir in order to render the pressure continuous.

In the paint tube of the nozzle and near the orifice is placed a strainer in a circular chamber, easily unscrewed, through which the paint has to pass, and which removes any chance of scum reaching the surface.

The air-pump is, of course, placed on the ground or floor, and is worked by a man or boy, while the container (which is made in various sizes) can either be above the person employed in applying the paint, and can be hung on a ladder, &c., or can be placed below; in the latter case greater pressure is required, the pump and the container being connected by flexible steel tubing. This steel tubing is $\frac{1}{2}$ in. internal diameter for the air, while that for the paint is $\frac{3}{8}$ in. The pressure applied by the air-pump ranges from 5 lbs. to 15 lbs. per square in., but a medium pressure of 10 lbs. is recommended for most work, although if two or more nozzles are at work with one air-pump, this can, if desired, be worked by power giving a greater pressure as required. In doing rough work, where smoothness is unimportant, and where it is desirable to make the paint thoroughly enter the pores of the wood, more than can be done by hand-work, a pressure of 15 lbs. may be applied with success.

On Monday, at the Barry Docks, near Cardiff, some experiments were gone through which served to point out the uses and advantages of the new invention, especially in the saving of labour.

The iron hull of a large trading vessel had been prepared ready for painting, and the apparatus was set to work. Nine square yards were painted in about 7 minutes, and the work seemed on inspection efficiently performed. A successful trial was also made with non-corrosive paint, which is hardly to be used by hand on account of its quick-drying properties.

A visit was next made to the Bute Docks Waggon Shed, where a railway-waggon, which takes a man two hours to paint one coat, was efficiently covered in 16 minutes by the new machine.

Experiments were then made on various classes of goods and ornamental surfaces. Ordinary doors were painted with rapidity, leaving a quite smooth surface, in which, of course, no brush-marks were to be distinguished. Stencilling on wood and plaster was also shown, and also the

painting of carved woodwork, such as a mantelpiece. The painting of raised and embossed surfaces, such as linework, showed that in many respects, besides the saving of labour, a smoother and truer coat is the result than in ordinary hand-painting. We think that there is certainly a future before the new invention.


COMPETITIONS.

MUNICIPAL BUILDINGS, COVENTRY.—In the competition for plans for the proposed new municipal buildings for Coventry, ten sets of designs were received from nine architects. The premiums offered by the City Council for the three best sets of designs—150*l.* to the first, and 50*l.* each to the second and third—have been awarded by the assessor, Mr. Charles Barry, to Mr. Harry Quick, Coventry; Mr. H. T. Hare, York Buildings, Adelphi, London; and Mr. Herbert W. Chattaway, Coventry. A criticism of the designs will be found on another page.

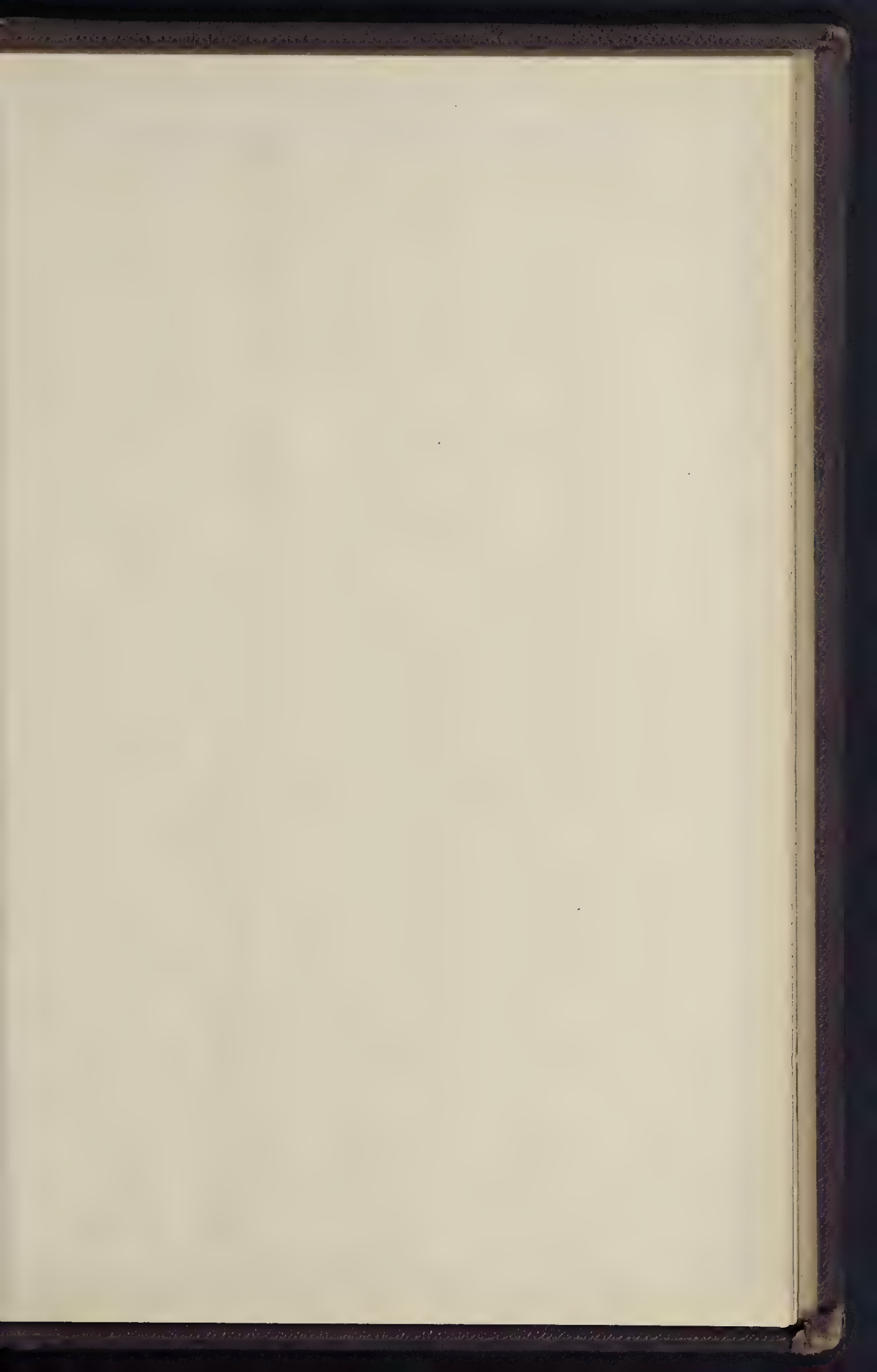
WORKING PUBLIC HALL.—Four architects having been asked to submit plans in competition for a public hall for Woking, two only responded, the conditions not being satisfactory. The plans of Mr. Ridler (of Homer & Ridler, of Bucklebury, E.C.), have been selected. A public meeting in furtherance of the project was held recently, when, according to the chairman's statement, the successful competitor is to be rewarded with a commission of 2 per cent. on the outlay!

Books.

Dionysos: Etude sur l'Organisation Matérielle du Théâtre Athénien. Par M. OCTAVE NAVARRE. Paris: Librairie C. Klincksieck. 1895.

 THE principal interest of this well-written little book at the present moment is that the author goes *seriatim* through the reasons for and against Dr. Dörpfeld's curious, and as we think, so far quite untenable theory of the non-existence of the separate stage, or *logion*, in the Greek Theatre of the great age of Greece. He sums up Dr. Dörpfeld's main arguments as consisting in—(1) the excessive height of the supposed *logion*; (2) the narrowness of the platform on it; (3) the absence of any staircase between that platform and the orchestra.

The height of the *logion*, as given by Vitruvius (10 to 12 ft.), is a real difficulty, and, to our thinking, the only real difficulty, in opposition to the generally-received opinion. The author's answer to this is that none of the *proscenium* which we know are earlier than the third century B.C., when the chorus as a separate element in the representation had disappeared. Even if we take Vitruvius's measurement (or his text) as correct, there is no necessity to suppose that two centuries earlier, when the relation between the chorus in the orchestra and the principal actors was very close, and they carried on dialogues of some length, the *logion* was of the same height as at a later period. He gives two examples from vases representing plays, in which the height of the *logion* is shown as not much more than half the stature of the actors. As to the narrow proportions of the platform, 7 to 10 ft., M. Navarre argues that a long stage of that width could, on exceptional occasions (and the occasions when any great number of persons appeared on it were very exceptional) accommodate a considerable number, and even take in, for instance, the chariot in which Agamemnon enters on his return home; and if the group of actors must have been very much spread out in a line in this case, such an arrangement was not out of keeping with the conventional character of the Greek drama, and was in keeping with Greek artistic taste generally, "which had always neglected effects of depth and perspective." The absence of steps in any of the remains hitherto found may be accounted for by the supposition that the steps were of wood, a supposition which accords with the ladder-like appearance of the steps shown in some vase-representations. M. Navarre then sums up the historical evidence for the existence of the *logion*, which amounts to a pretty formidable body of evidence, and concludes that Dr. Dörpfeld's theory is contrary to the unanimous literary testimony of ancient writers. He concurs with Dr. Dörpfeld only in the view that a *logion* of ten to twelve feet high would have been an absurdity when the principal actors on it were in close dramatic relation with the chorus; only maintaining, as before observed, that we are

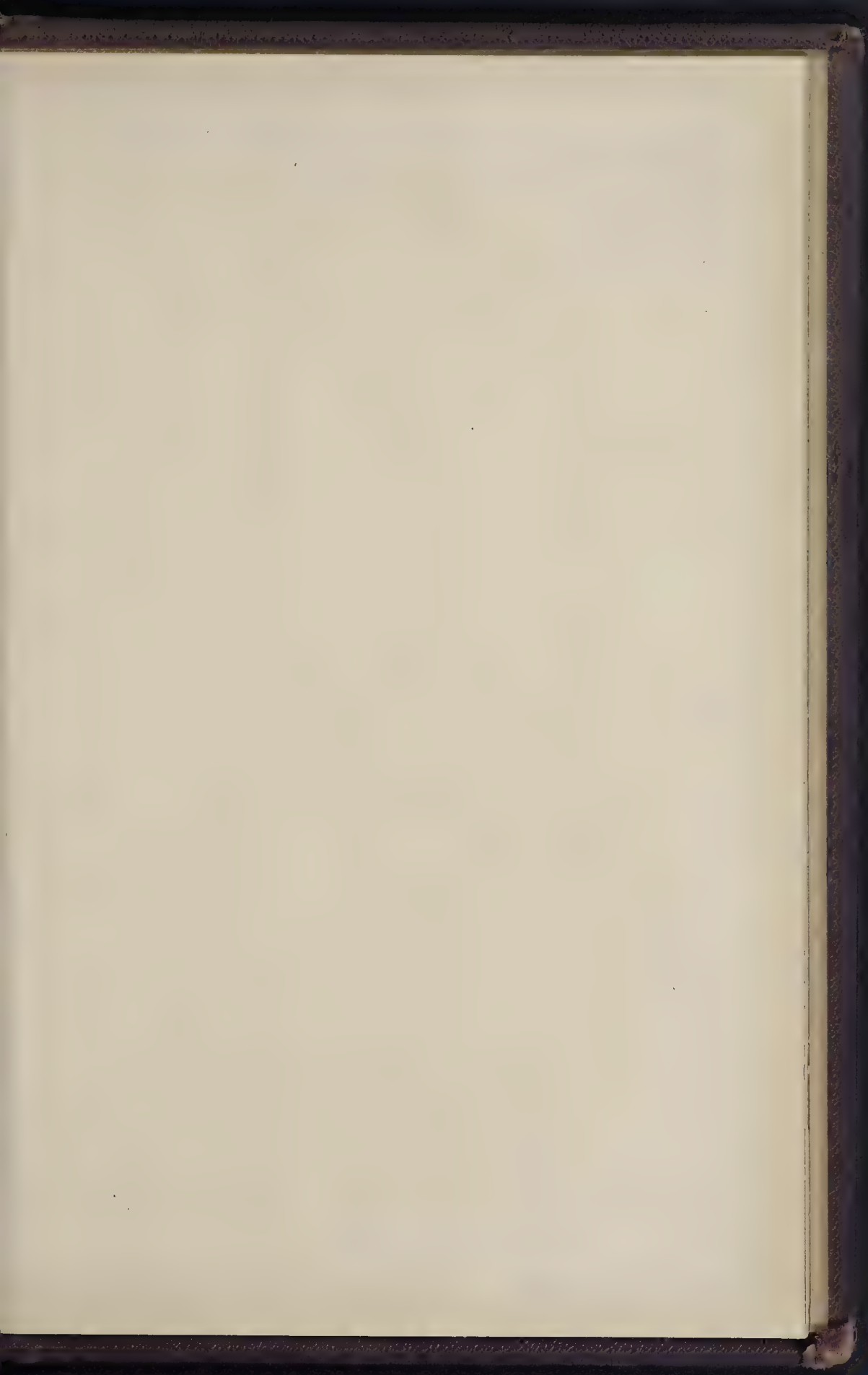




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STER.—FROM A DRAWING BY MR. T. P. IVISON.

under no necessity to suppose that it was of such a height in the great days of the Greek drama. The argument as stated here seems almost conclusive against Dr. Dörpfeld, and the author evidently considers it so.

M. Navarre gives a useful plan and description of the Theatre of Dionysos at Athens, tracing out the remains belonging to different epochs and the reasons for assigning them to those epochs. The history and development of the Greek Theatre are briefly treated, and the remainder of the book is occupied with the subjects of decorations, masks, costume, and inscriptions and monuments. It is a book to be looked at by all who are interested in the subject of the Greek Theatre.

Quantities: A Text-book for Surveyors in Tabulated Form, &c. Sixth edition. By BANISTER FLETCHER, Professor of Architecture and Building Construction, King's College, London. London: B. T. Batsford, 1895.

IN this sixth edition of his useful work on Quantities Professor Banister Fletcher has made various additions with the view of rendering the work more complete. An original design for an entrance-lodge is added, with plans, sections, and elevations, in order to illustrate the complete taking off in all trades. The constants have been revised, and tables of formulas for strength of materials added. The illustrations have been nearly all re-drawn, taking more modern subjects, and the chapter on law has been revised and brought up to date.

A book like this is a useful study for a young architect, even if he has no intention of taking out quantities for himself, for the enumeration of the various things to be provided for in quantity-taking may remind many a young architect of items that he would otherwise forget, as we know that they often are forgotten, and the omission has to be pointed out by the quantity surveyor: not an agreeable position for the architect.

Churches and Castles of Medieval France. By WALTER CRANSTON LARNED. London: Sampson Low, Marston, & Co. 1895.

THIS is a pleasantly-written amateur book, illustrated by photographs of the principal cathedrals and châteaux visited, but of no value to students, for whom, in fact, it is not intended. It seems to have been written mainly for the author's own pleasure, but ostensibly also with a view to increasing the interest of travellers in the great architectural monuments of France. We hardly know that any such stimulus is much required in the present day. In giving praise to the French for the interest they show in their historical monuments, and their willingness to spend money in preserving these, the author does not seem to recognise what a very doubtful good the work of the "Commission des Monuments Historiques" has been in many cases, in regard to the extent to which "restoration" has been carried. In other respects his remarks on the architecture of the various monuments show more perception of architectural effect and treatment than is commonly found in the writings of amateurs.

The Temple Church and Chapel of St. Ann. A Historical Record and Guide. By T. HENRY BAYLIS, Q.C., M.A. London: George Philip & Son.

THIS is a useful book for those visiting the Temple Church, as it consists mainly of a collection, in a convenient and portable form, of information in regard to the history of the church and its monuments, summarised from a number of authorities and records of different dates, and appears to have been done with great care. Its interest is rather historical than architectural, but a plan of the church is added, and a rather hardly and inadequately-drawn perspective of the interior of the round church forms a frontispiece.

Correspondence.

To the Editor of THE BUILDER.

THE NEW INSTITUTION OF CIVIL ENGINEERS.

SIR,—Allow me to add to your notice and illustration of the above, that the external stone-carving and the somewhat elaborate wood-carving of the Library is being executed by Messrs. Mabey & Son; while the memorial busts which are to fill the niches of the frieze of the façade are being executed, from original busts in the possession of the Institution, by Mr. H. C. Fehr, whose remarkable group of "Perseus and Andromeda, treated, as will be remembered, in a

most original manner, was exhibited at the Royal Academy's exhibition of last year, and was considered worthy to be purchased by the Trustees of the Chantry Bequest.

The Engineers to be thus commemorated were carefully chosen by the Council, and are:—Brindley, Smeaton, Watt, Telford, J. Rennie, G. Stephenson, and Mark Isambard Brunel.

CHARLES BARRY.

DESIGN FOR RACING CUPS.

SIR,—I often see in the journals illustrations of Racing Cups, which make me pine, not for their possession, but for an article in the *Builder* dealing with these things as you dealt with the jewellery. Teapots and sugar-basins have mended their ways, and have given up their old gouty forms, but sporting plate clings to models which might hail from the catalogue of the 1851 Exhibition. This year's Manchester Cup, for instance, seems, from its portrait in the *St. James's Budget*, to be so bad that the jockeys might be expected to refuse to ride for such a thing if they saw it. Figures of Truth and Prudence, virtues altogether appropriate for a nineteenth-century turf trophy, are perched on weak little brackets to form the handles, and Fame, on a very reduced scale, stands on the lid. Thin lions, rampant, squat on an unsafe astragal at the base, beside wreaths big enough for them to jump through. The whole thing appears to be built up out of a jumble of stock details, regardless of their respective scales. The authorship is claimed by a great firm, of course; it is always so with these things, except in the case of minor provincial meetings, when our fellow-townsmen, the local jeweller, suppresses the big firm's name and substitutes his own, not as having designed, but as having sold the prize, a far more difficult matter one would imagine, if one did not know how complete is the divorce of art from sport. It would be interesting to learn whether the prices have, like the patterns, stood still, or whether, with silver at about half the old rate, the trophies are either half the old price or double the old weight.

L. C. R.

JEWELLERY DESIGN.

SIR,—Some time ago you dealt with the lack of design in jewellery, and illustrated your remarks from a West-end dealer's catalogue. I enclose a page from the *Daily Graphic* of to-day illustrating some of the presents to the Princess Helene on her marriage, and fear your remarks are more than ever justified.

EDGAR A. HAWKINS.

London, June 26.

SEWAGE PURIFICATION.

SIR,—My attention has been called to a notice in the *Builder* of the 15th inst. of the lecture delivered by me at the School of Military Engineering, Chatham, on "Sewage Purification," in which exception is taken to certain remarks, contained in the lecture, on the Scott-Moncreiff process.

The clerical error about the size of the filter-bed is manifest; but the whole of the paragraph in question is taken from an article on the Scott-Moncreiff system which appeared in *Nature* of January 11, 1894, of which I enclose a copy, and I am not in any way responsible for the opinions expressed therein.

CHARLES H. BELOE, M.Inst.C.E.

The Student's Column.

BRICKS AND TERRA-COTTA.—XXVI.

LOCAL DEVELOPMENT OF BRICK-EARTHS (continued).

The Midlands.

A PART from the superficial drift deposits, many clays in the Midlands are dug in the Lias and Triassic formations. As a general rule, those from the former series are dark grey or blue-black, whilst those from the latter are red or of chocolate colour. Speaking in round terms of the Lias of the district, it may be noted that it is very variable in composition, and sometimes contains carbonaceous matter, which is not a desirable constituent. At certain places it has a superabundance of carbonate of lime (as much as 30 per cent.) so that bricks cannot be made from it. At Hill Moreton, near Rugby, however, these clays furnish superior bricks, and it is said* that their red colour becomes brighter after use and exposure in buildings.

In other localities the Lias has too many nodules of "race" and iron-pyrites. That from the base of the formation near Painswick is of good quality, and is extensively used for making pottery at Cranham—as, indeed, it has been since the time of Queen Elizabeth, if not earlier. The section there shows about 12 to 15 ft. of blue clay, micaceous, and containing a few ferruginous

* H. B. Woodward, "The Jurassic Rocks of Britain," vol. iii. (1893), p. 298.

nodules. At Loseby, to the north-east of Leicester, the Lias clays are also much drawn upon for pottery-ware purposes. The beds are composed of clays and shales, with septaria and nodules of ironstone to the depth of about 25 ft. At the brickyards at Kingthorpe, near Northampton, red bricks and tiles are manufactured, including moulded, pressed, and common bricks, pantiles, ridge-tiles, and the like. In spite of the excellence of the earth in some localities, however, most of the lower Lias clays are stiff and calcareous; there are seldom any loamy beds such as are naturally adapted for brick-making.

The Poikilitic clays and marls in the Midlands are most extensively used in Leicestershire and neighbouring counties. The following complete analyses by Dr. Voelcker of two kinds of marl from the Keuper formation at Worcester, both of which earths are employed for brickmaking, serve to show the composition of the beds in the area.

Chemical Composition of Keuper Marls—Worcester.

	Red Marl.	Grey Marl.
Water of combination	4.45	3.71
Protoxide of iron	1.60	1.77
Sesquioxide of iron	2.41	.80
Bisulphide of iron	.059	.02
Alumina	11.74	12.77
Lime	4.85	3.71
Magnesia	3.06	2.17
Potash	.69	.71
Soda	traces	.02
Sulphuric acid	.09	.08
Carbonic acid and loss	3.31	4.74
Alumina	9.39	11.72
Silica	53.22	53.40
Oxides of iron	.78	.99
Lime	.64	.61
Magnesia	1.69	1.11
Alkalies and loss	2.22	1.66

The brick and tile industry in the neighbourhood of Stoke-on-Trent is a large one, and the following particulars as to the method of using the marls in that district will be found useful. The formation consists of several clays and marls alternating with each other, and these are selected and mixed together in proportions necessary to produce a desired tint. Only the earth in the natural state is used; no colouring matter, sand, ashes, or other material is incorporated therewith, the actual colour of the finished goods being obtained in the firing. At the Hartsbill brick-works the marls are quarried from the open face, blasting being needful in some cases owing to the rock-like nature of certain beds. The stronger marls are thrown back into the clays to weather before being subjected to any mechanical treatment, the object of this being to open the pores of the clay, and to separate the particles so that it will grind more readily, and absorb water in the subsequent process of mellowing. Several modes of treating the marl after leaving the pit are adopted in these brickworks; one process is to pass the marl (whether previously weathered or not) through several pairs of iron rolls, the marl so ground dropping into what is termed a mixer, after passing through which it is further tempered by being sent through a pug-mill, the clay then being ready for the moulder if required for common goods, or housed away to mellow if it is to be used for finer class goods. Another process is to pass the marl on coming from the pit through a perforated revolving pan (somewhat like a mortar-mill), and subsequently, when roughly ground, through rolls, when it is ground finer into flat cakes varying in thickness from one-sixteenth to three-sixteenth in. These are arranged in layers or courses about 1 ft. in 1 ft. 6 in. each course, to a depth of from 3 ft. to 5 ft., watered, and allowed to weather for a certain time, depending on the season of the year the heaps are prepared. When sufficiently weathered the prepared earth is introduced to a pug-mill for further tempering, before being taken to the moulders' houses to be made into hand-made bricks and tiles. It may be noted that all roofing, paving, and ridge-tiles manufactured in the brickworks alluded to are hand-moulded and hand-pressed. The goods are burnt in a kiln with circular down-draught; most of the marls in the district fire red in various tints. The proprietors have courteously furnished us with the following chemical analysis referring to mixed marls of kinds similar to those just described:—

Chemical Composition of Marls—Stoke-on-Trent.

Silica	65.0
Alumina	26.0
Peroxide of iron	11.0
Oxide of Manganese	traces
Water	3.0

100.0

Shropshire District.

The clays drawn upon for making bricks and tiles in this area come principally from the Coal Measures, and are mined at great depths. At Brosley the brick clay occurs in a stratum from 8 ft. to 12 ft. in thickness. It is mined as a hard, rocky mass, and obtained by blasting; on exposure to the air, however, it is readily reduced to a plastic condition. The clay contracts but very little in burning, so that the bricks retain an even form and uniform size after being fired. At Benthall, near Brosley, the "Ganic-coal fire-clay," from the Lower Coal Measures, is employed. This under-clay is usually about 2 ft. in thickness, with occasional small concretions of iron in nodules. Its colour is grey, owing partly to the presence of carbonaceous matter. It burns a pale buff or cream colour, and is one of the most refractory clays in the area; extensively employed in the manufacture of bricks and tiles. An analysis by Dr. Voelcker shows that it contains 1.48 per cent. of protoxide of iron, as carbonate.

Yorkshire District.

The underclays of coal-seams yield material suitable for the manufacture of fireclay goods in many parts of Yorkshire. Gannister also is worked in several localities, though very variable in composition. In the north-eastern part of the county the Jurassic rocks have long been exploited for clays for brick and tile making, and in the Howardian Hills there exists a seam of clay—described by Mr. W. H. Hudleston as a very fine potter's earth, which, in all probability, was employed by the Romans in the manufacture of pottery, the remains of which, and portions of kilns, have been discovered in the neighbourhood of Cram Beck. The best material in that part of the county is obtained from the Estuarine Series, alluded to in the last article, which consists of irregular beds of shale and thin sandstone. Mr. C. Fox-Strangways remarks that these, when ground up and mixed in suitable proportions, form good bricks and tiles, whilst, in some cases, sanitary pipes, flooring-tiles, and a coarse kind of pottery have been made from them. The principal works are at Scarborough, at Egton, and at Skelderskew, on Commodore Moor. Along the sea coast and in Cleveland, the Boulder Clay is very generally used for brickmaking, whilst in the Vale of Pickering, at Hildesley, North Grimston, and Birdsall the Kimeridge Clay has also been employed for this purpose, but at the latter place these shales were found unsuitable. Some of the shales in the area are capable of being baked into hard slabs without previously working them into a plastic state. From the manner in which these slabs are prepared, the ravine where they are obtained is called Bakestone-gill.

In the neighbourhood of Guisborough the laminated clay occurring above the Lower Boulder Clay is extensively worked for bricks, tiles, and drain-pipes; but the same beds, says Mr. George Barrow, of the Geological Survey, are used to a far greater extent near Middlesbrough, a large part of that town being built of bricks made from them. The Upper Boulder Clay in the same district, being of a light nature, and nearly free from stones, has also been used for brickmaking to supply the local demand.

As examples of sections in various yards, the following may be quoted:—

*Brickyard between Riccall and Esrick.**

	ft.	in.
Top soil.....	1	0
Brown peaty sand	1	0
Yellow sand; surface eroded; hollows lined with partings of clay	2	0
Coarse brown sand	1	0
Gravel	0	6
Laminated clay	10	0

Brick and Tile Yard, Eastrington.†

	ft.	in.
Blue clay	4	0
Sand	0	7
Black clay	9	0

Silty clay.—Laminated clay, with partings of dry sand; about 40 ft. in thickness; nearly free from stones.

Brickyard at Staddlethorpe.

	ft.	in.
Sand	3	0
Yellow clay	1	6
Strong clay, with limestone	2	0
White clay	6	0
Black clay	40	0

* Dr. Parsons, "Proc. Yorks. Geol. Soc.," vol. vi., p. 236.

† "York and Hull," ("Mem. Geol. Surv.," 1886, p. 43.)

Brickyard at River Bridge, Market Weighton.

	ft.	in.
Warp	1	0
Peat	0	6
Sand, white under the peat, then on passing below strongly ferruginous, yellow gravel at base	15	0
Grey clay, strongly laminated	8	0

Other brickyards are at Howden, Thimble Hall, Bromfleet Landing, and Melton Creek.

Lancashire District.

Mr. C. E. De Rance, in his memoir on the superficial geology of the country adjoining the coasts of south-west Lancashire, states that, in the valley of the Mersey, and in the country fringing the coast between that river and the Ribble, the Lower Boulder Clay is used for the manufacture of bricks and tiles, and the more calcareous portions are dug for "marl," which is applied in improving the moss-lands in the valley of the last-mentioned river. At Blackpool, Preston, Blackburn, and near Croston, the Upper Boulder Clay also is very largely worked for bricks. Ordinary kilns are used; and it is noteworthy that the bricks obtained are seldom of first-class quality, and rarely free from included pebbles. The same author states that, near Formby the Estuarine Clays have been made into bricks, but when tried at Birkdale, they were found to be too sandy; as a remedy to this, he suggests that the earth might be mixed with very stiff Boulder Clay found in the neighbourhood.

In the country around Prescott the Boulder Clay is also the chief source of bricks. It is usually worked to a depth of from 6 to 8 ft., the weather having favourably affected it to that level. This suggests the desirability of digging the material and "weathering" it by spreading it out in a proper manner. The workmen take advantage of a natural vertical jointing to wedge off the clay from the sides of the pits in large masses, which are then broken up and left to temper during the winter, the stones being, in most cases, picked out by hand. Owing to the difficulty of picking out all the fragments, especially those of limestone, it is said that the bricks are not of first-rate quality. At one brickyard the clay has been worked to a depth of 16 ft., and, after being ground, together with its included boulders, is at once transferred to a brickmaking machine. The tidal mud has been tried at Warrington for brickmaking, but proved worthless, from its sandy nature; this seems to indicate a want of knowledge on the part of the manufacturers as to what materials from a metallurgical point of view should be employed for making good bricks, and as to the method of their treatment. At Frodsham a tough bed of blue clay, 4 ft. in thickness, proved to be of better quality. A reddish marl, forming the most recent alluvial deposit of the River Weaver at Dutton Bottoms, was used in making bricks for canal locks in the district.

In the area lying north of the Ribble, the Boulder Clay forms a considerable portion of the surface. The following section may be noted:—

Brickyard Section—Snape Green.

	ft.	in.
Sandy mould with shells	1	0
Greysish white sand	1	0
Black sand, pealy	1	0
Thin pebble bed in clay	0	3
Red Boulder Clay with pebbles and boulders	4	0

Chester District.

As in the Midlands, the marls of Lower Secondary age are utilised for the manufacture of bricks and tiles; much of the earth, however, is unsuitable except for a poor class of goods, especially when impregnated with salt. The Boulder Clay is the chief source of bricks in the district. Mr. Aubrey Strahan, of the Geological Survey, states that it is turned over to a depth of 6 ft. in the autumn and left to temper during the winter; the boulders are picked out by hand. There are numerous brick-pits in the suburbs of Chester, chiefly in the neighbourhood of Boughton and Bishop's Fields. The clay is often found to be of best quality for bricks close to its margin, where it is thinning off upon a rising slope either of rock or sand.

North Wales District.

Perhaps the best-known bricks and terra-cotta made in North Wales come from Ruabon and the vicinity. The clays are of great thickness, and produce goods of first-rate quality. We have alluded to them on more than one occasion in the course of these articles, and have published results as to certain of their physical properties.

The Buckley bricks, also, come from this district, and are made from the Fireclay Series of the Middle Coal Measures. The brickworks occur along a belt of country ranging N.N.W. to S.S.E., and the general mode of occurrence of the divers beds may be gathered from the following section:—

Brickyard Section—The Castle, Buckley.

Hard fireclay, 9 ft., dark fireclay, 3 ft. 6 in., yellow fireclay, 10 ft., red fireclay, 3 ft., sandstone, 10 ft., fireclay, 16 ft. South of this, at Ewloe Barn, a brickyard shows that the fireclay is capped by yellow sandstone and Boulder Clay.

Brickyard Section—Brookhill.

Rock, 17 ft., purple fireclay, 17 ft., light fireclay, 3 ft., dark fireclay, 16 ft., light shaly fireclay, 3 ft., coal-seam, 9 in., grey fireclay, 1 ft.

Good sections may also be seen in the same district at the Etna brickworks, Old Ewloe, in the three large excavations forming the Mount Pleasant and the Knowl-lane brickworks. A pit at the back of the last-mentioned works, now abandoned, gives Boulder Clay 6 ft., and fireclay 40 ft. But we have no intention of describing in detail the various yards deriving their material from the clays of the Coal Measures all over the country where these crop out. In several districts the under-clays are obtained in the process of mining, and it is not an uncommon thing to find that the colliery-owner is also a brickmaker, in consequence.

Bricks are made from superficial deposits in many parts of North Wales, chiefly for local use, as in the Vale of Clwyd, Colwyn Bay, and near Rhyl.

Durham and Northumberland.

We have alluded already to the fire-clays so largely used in these counties, and especially to those worked in the neighbourhood of Newcastle-on-Tyne. Mr. Hugh Miller remarks* that in the vicinity of Elsdon small brick and tile works have been temporarily erected at several places. In these cases the materials are taken from the outcrop of shales at the surface, where they are partly decomposed and mingled with drift. There are also brickworks on the road from Sharptown to Rothbury, where the earth is a decomposed green shale, with sundry lumps of sandstone and limestone. The few seams of fire-clay that exist in the neighbourhood have not been utilised.

Conclusion.

With this, the series of articles on Bricks and Terra-cotta is brought to a close. We trust that we have said sufficient to show the student the paramount necessity for learning in detail the method of brick manufacture as influencing the weather-resisting properties and general quality of this most commonly used of building materials; whilst, on the other hand, we feel sure that it is of interest to the manufacturer to know of the various chemical, physical, mineralogical, and metallurgical properties of the particular class of earths used in different parts of the country. We may note, however, that in spite of the mass of information got together, and the still larger proportion of original research embodied in these articles, a great deal yet remains to be done in almost every branch of the subject. In particular, it is very desirable to more fully understand the action of the metallurgical operations involved in the production of the better kinds of goods, whereby in one district a superior article results, whilst in another it is comparatively inferior, and that from earth of practically the same composition and treated in precisely similar ways. We have shown that this is in some cases due to the dissemination throughout the clays of larger or smaller particles of mineral matter of similar chemical composition, but possessing different physical properties. No doubt the solution of the difficulty is to be found in further resolving the connexion between the structure of such particles and their behaviour under intense heat. In some measure this may be done by aid of the blowpipe, or by the microscope, but much of the matter composing clays being iron-stained, is opaque, and we look forward to investigating these difficult earths by means of an instrument not yet mentioned—viz., the spectroscopic, the special use of which in estimating the nature of divers minerals has been so prominently brought forward of late by the discovery of those bodies—be they compound or elementary—known as argon and helium.

With reference to terra-cotta, we have not been able to go as thoroughly into this as we could wish, though from its intimate relationship

* "The Geology of the Country around Otterburn and Elsdon," 1887, p. 124.

with brick almost everything that is said of the one applies equally to the other. Brought up in the hard school of experience, for the most part, terra-cotta manufacturers possess an intimate knowledge of the properties of expansion and contraction of divers clays used in making their goods; but very few possess even the most rudimentary knowledge of the causes which lead to the results obtained, from a scientific aspect. The result is that goods are often produced solely for their shape and colour, and the student of architecture must exercise even greater care in selecting terra-cotta than bricks. Finally, let us again urge the student to learn all he possibly can concerning the manufacture of these clay goods, though he may never be a manufacturer himself. That will assist him to identify any particular kind specified, and also to gauge its relative qualities—permanence of colour, absorptive properties, resistance to pressure, and durability.

SURVEYORSHIP APPOINTMENT.

STOKE.—The Stoke Rural District Council have had under consideration twelve applications for the post of Surveyor to the Council and Engineer to the Bucknall Sewage Scheme. In the end it was announced that Mr. Larnier Sugden, architect, had been unanimously elected.

OBITUARY.

MR. HENRY MOORE, R.A.—Mr. Henry Moore, the well-known Academician and sea painter, died on the 22nd inst., at Margate, from the results of a paralytic seizure. Mr. Moore was born on March 7, 1831. His father, William Moore, of York, was in his time a successful artist of some ability, and Henry, with his four brothers, Albert, his junior by ten years, who died in 1893, Edwin, John, and William, all followed the same profession. He showed early signs of promise, and received his first lessons in art from his father long before he went up to London for the regular course. In fact, he exhibited his first picture—a landscape—at the Royal Academy in the same year (1853) as he entered the Academy schools. He was at first a landscape painter, and only in middle life began to devote his attention exclusively to the marine studies by which he is best known. He was elected a member of the Royal Water Colour Society in 1880, an Associate of the Royal Academy in 1885, and two years ago was promoted to full membership. He had gained the Prix de Paris and the Legion of Honour decoration for his picture "Clearness after Rain."

MR. J. E. HODGSON, R.A.—The death has just taken place of Mr. John Evan Hodgson, R.A., aged sixty-four. He was a Londoner, although some of the early days of his life were spent in Russia. He was educated at Rugby, and thence commenced a commercial career. But his artistic tastes caused him, at the age of twenty-two, to return to London, and join the school at the Royal Academy. Three years later his first picture was hung, and it was followed during the next thirty years by numerous canvases. In December, 1879, he was elected a Royal Academician.

GENERAL BUILDING NEWS.

NEW LIBRARY FOR ST. GEORGE'S, HANOVER-SQUARE.—A new Public Library for the Parish of St. George's, Hanover-square, is to be opened to the public on July 1, from the designs by Mr. A. T. Bolton, on a site in Chapel-place North, South Audley-street. The elevations are of red brick and terra-cotta, in the style which has almost become the accepted one for buildings of a public or semi-public character. The design, in spite of many good qualities, lacks repose and simplicity; the portico seems needlessly large and obtrusive, and the window mullions and transoms, of terra-cotta, are too heavy. It would have been preferable to have increased the size of the lighting areas by omitting some of the transoms; this would result in better proportioned windows and increased light to the reading-room and library. The plan is very simple. It consists, on the ground floor, of a hall, a staircase, large reading-room, and children's lending library. This children's library was an after-thought, the room having been intended for a librarian's room. Its present use is an experiment likely, we consider, to answer well. The books to be issued from this juvenile library are suitable for those up to thirteen; after that age is reached, the readers are transferred to the general lending library. Adequate supervision of the large reading-room there is not; a small box for a boy is placed in an angle of the room, to be used occasionally when the porter is not on duty in the vestibule. An improvement might be effected in this respect by the provision of some means of supervision from the children's lending library, which could easily be done. The reference and lending libraries are on the first-floor, neither being quite complete at the time of our visit. The most conspicuous features in the reference library are two large open fire-places with high terra-cotta mantels. These, in themselves,

are fairly satisfactory, though cold in colour, and with suitable fires would no doubt have the air of fitness and comfort to be looked for in a room of this use. But, unfortunately the space intended for a fire is used as a backing for an iron radiator standing clear of its surroundings in the most cheerless and inconspicuous manner. Is the architect or are the Commissioners responsible for this? The rooms on this floor, as well as those below, are all fitted with electric light, by Messrs. Benham & Sons. The bookcases and other library and reading-room fittings were supplied by Messrs. Gillows. Messrs. Mowlem were the general contractors for the work, which is well and carefully carried out. When the interior fittings have been completed in the manner intended, St. George's parish will have a generally well-arranged and well-appointed Public Library.

WESLEYAN CHURCH, BRAMHOPE, YORKSHIRE.—The memorial-stones were laid recently of a new Wesleyan church for Bramhope. The church is to be in the Decorated Gothic style, with nave, transepts, chancel, and a large square tower and spire is to be placed at one angle, rising to a height of 120 ft. The exterior is to be built of wall-stones from Apperley and Bradford, with ashlar dressings from Guseley. The windows will be of tracery, the one in front having four lights. The interior woodwork will be of pitch-pine. The windows will fill the interior with light. Behind the church are schools, class-rooms, vestry, &c. A detached house for the caretaker is to be built at the back. The chapel will accommodate 170 persons, and the cost of the buildings will be about 2,200l. The architect is Mr. W. J. Morley, of Bradford and Harrogate; and the contractors are Mr. Lawrence, mason, Huddersfield; Mr. S. Kaye, joiner, Paris; Messrs. Shuttleworth & Sons, plumbers, Otley; Mr. W. Walker, slater, Otley; Mr. A. Taylor, plasterer, Ecclehill; and Messrs. Coudwell & Sons, painters, Leeds.

WAREHOUSE FOR THE MIDLAND RAILWAY CO., LIVERPOOL.—The Midland Railway Company has just erected at Liverpool a new warehouse. The building, along with its necessary offices, covers a large area. The building itself is supported on iron girders of about 10 tons each, which rest on 96 columns, each weighing about 4½ tons, these being carried through all the floors. The columns on the ground-floor rest on granite blocks weighing 12 tons each, which are embedded in brick and concrete to a depth of 16 ft. The warehouse is of five stories, the entire length of the building being 322 ft., width 176 ft., and it stands 8½ ft. in height. The large iron roof is patent glazed, and supported on girders weighing about 22 tons each. It is illuminated by the electric light. The hydraulic machinery consists of 20 cranes of 30 to 40 cwt. capacity; 10 jiggers, 5 to 15 cwt. capacity; 22 hoists of 20 cwt. capacity; 22 hauling capstans, and 6 traversers, these being supplied by Messrs. Tannett, Walker & Co., Leeds; while the power is obtained from the Liverpool Hydraulic Power Co. All engines, &c., for driving the electric light apparatus and hydraulic plant are in charge of Mr. L. S. Smart, the Midland Railway Company's resident engineer, the works for which consist of a separate lot of buildings, with engine-rooms, stores, fitters' and blacksmiths' shops, and messroom. In addition to the warehouse, the cotton quay, iron and fruit warehouses, out offices, and the entire yard are supplied with the electric light. The covered cotton and grain wharves, which adjoin the principal building, is 600 ft. long and 103 ft. wide. The whole of the work has been carried out from plans and designs by the Midland Company's architect, Mr. Charles Trubshaw, under the supervision of Mr. J. Rhodes, the company's clerk of the works. The contractors were Messrs. W. Brown & Son, Salop, their managing foreman being Mr. J. Delve. The sub-contractors for the ironwork were Messrs. Eastwood, Swingle & Co., Derby.

NEW CHAPEL, WOLVERHAMPTON ORPHAN ASYLUM.—A chapel has just been added to the Wolverhampton Orphan Asylum. The builders are Messrs. H. Wilcock & Co., Wolverhampton, and the architect is Mr. Fred T. Beck, also of Wolverhampton. The building is arranged with nave, chancel, and two transepts, and seating accommodation is found for 400 persons. The choir will be composed of between thirty and forty boys from the Orphanage, and at the rear of the choir seats in the south-east angle is the organ chamber. A vestry for the use of the clergy—with store attached—is erected, with two staircases, one for the boys and children (through the north transept) and for visitors (at the north-west of the nave), and a western doorway for the exit or entrance of the clergy, &c. The materials used for the exterior of the structure are pressed facing bricks, relieved with diaper work and stone dressings to match the existing building, green slates for the roofs, the woodwork oak, and the turrets covered with copper or lead. Internally, it is proposed to finish the walls in stucco, relieved with stone quoins and bandings, the upper part of the chancel walls being faced entirely with stone, and the lower part stuccoed, to admit of future decoration in frescoes or mosaics when desired. The roof timbers are of red deal, and the floors of the aisles were laid by Messrs. Minton, Hollins, & Co. The seats and other fittings are of red deal, and the communion-table, pulpit, and choir stalls were of oak. The method of heating is by hot water.

Ventilation is provided for by means of fresh air inlets and concealed roof ventilators.

HOTEL, NEWCASTLE.—A new County Hotel has just been erected at Newcastle. The restaurant is placed on the ground floor, with the main entrance from Grainger-street, and has been fitted up under the direction of Mr. J. T. Cackett, of Newcastle, the architect for the County Hotel. Mr. Thomas Weatheritt is the contractor, Mr. Cole did the decorating, and Mr. R. J. Charleton the electric lighting.

CONSERVATIVE CLUB, SEAHAM HARBOUR.—On the 22nd inst. the foundation-stone was laid of a new Conservative Club at Seaham Colliery. The building is to be constructed with bricks, faced with pressed bricks, and on a stone base. The plans were designed by Mr. George Braban, of Seaham Colliery, and the structure is to be erected by the colliery masons. At the far end of the entrance-hall there will be a bar. The first room on the right will be devoted to billiards, and is 36 ft. by 26 ft. On the opposite side of the hall there will be the reading-room, and next to it a smoke room. These two apartments are to be divided by a wooden partition, which can be removed. There will also be a committee room, caretakers' rooms, and other conveniences.

COUNTY OFFICES, ROTHWELL, YORKSHIRE.—New offices for Rothwell Urban District are now in course of erection in Marsh-street, Rothwell. The building is in the Gothic style. The plans show the Surveyor's and Clerk's rooms situated at one side of the entrance-hall. There is also on the ground-floor a strong room, two lavatories, &c. A stone staircase leads from the back portion of the hall to the first-floor, where a Council-room, 28 ft. long by 24 ft. wide, is situated. An apartment adjoins. The building, which stands back from the road, is being erected from the designs of Messrs. T. H. & W. E. Richardson, architects, Leeds and Rothwell. The following are the contractors:—Mr. John Chapman, builder; Mr. John Ingleston, joiner; Mr. George Wilson, plumber; Mr. T. E. Heavyside, slater; Mr. Tom Moore, plasterer; and Messrs. A. & G. Barker, painters.

WESLEYAN CHAPEL, ILKESTON.—The foundation-stones of the new Wesleyan Chapel on Corporation-road, Ilkerton, were laid recently. The building is 45 ft. long by 28 ft. wide, and will have attached suitable offices, including kitchen, &c. The plans are by Mr. William Nickling, Ilkerton, and the builder is Mr. John Manners, of the same place.

MEMORIAL HALL, SEAHAM HARBOUR.—On the 22nd inst. the Marchioness of Londonderry opened the Robert Candlish Memorial Hall. The hall is built from designs by Mr. Frank Caws, of Sunderland, and is of red brick relieved with terra-cotta around the windows and doors. It has its main entrance in Candlish-terrace. The interior comprises a large hall on the basement, and on the right side is a room fitted out as a library, and available for games and recreation. Upstairs is a reading-room and a committee-room. The windows in the basement are of stained glass.

SANITARY AND ENGINEERING NEWS.

THE SANITARY AND HEALTH CONGRESS IN PARIS.—Mr. E. Tidman, 34, Victoria-street, writes: "I have been officially requested by the French Society of Sanitary Engineers and Architects (of which I have the honour to be a member) to invite all English Sanitary Inspectors to attend and assist at the above Congress, which is to be held in Paris from July 7 to July 13 next. I have also been appointed to represent the Sanitary Inspectors' Association thereat, and have made arrangements with Messrs. T. Cook and Son for the journey to and from Paris, and hotel accommodation whilst there, at most reasonable rates. Any inspectors desiring to join the party can have full particulars on application to me. The Congress promises to be a brilliant one, supported as it is by the Ministers of the 'Interior,' of 'Commerce,' and of 'Public Works' of the French Republic, as well as the leading sanitarians in France. I trust, although the time is short, that all sanitary inspectors and others interested in sanitary work will endeavour to attend."

PONTEFRAC RURAL SANITARY AUTHORITY: GLASSHOUGHTON DRAINAGE.—Mr. W. B. Clerke, M.Inst.C.E., held a Local Government inquiry at GlasshoUGHTON on the 21st inst., into an application for power to borrow 5,000l. for a scheme of drainage and sewage treatment for the parish. Mr. Malcolm Paterson, M.Inst.C.E., explained the proposed works and method of sewage treatment, which will be by precipitation in tanks, and filtration on two acres of land.

MINGARY PIER, ARDNAMURCHAN.—The new pier at Mingary has recently been completed. Mr. John Adams, Glasgow, was the contractor; Mr. Wolfe Brennan, C.E., Oban, architect; and Mr. Marshall, inspector of works. The pier is chiefly of concrete, and faced with timber. The frontage extends to nearly 60 ft., and the depth at low water is nearly 12 ft.

FOREIGN AND COLONIAL.

FRANCE.—The Conseil Supérieur des Beaux-Arts has awarded the Ville de Paris prize to M. Georges Barreau, sculptor, for his plaster group "Four le

Drapeau," exhibited at the Champs Elysées Salon. —At the Louvre the galleries set apart for the fine collection of Chinese porcelain presented by M. Grandier have just been opened. M. Grandier also intends to offer to the Museum a collection of Japanese ceramic work valued at 30,000 francs, and which include 800 separate examples. —The approaching demolition of the Mazas prison will leave a large empty space of ground near the Gare de Lyon, on which it is intended to build a large hall for spectacular displays. —There is talk of the much-desired completion of the Boulevard Haussmann being carried out, by the formation of a proprietary syndicate. —The monument to the "Victimes du Devoir" at Courbevoie, has just been solemnly inaugurated. It has been carried out after the designs of M. Leroux, architect. M. Séguin, as sculptor, has assisted in the decorative work. —The Prefect of the Seine has taken in hand the complete reorganisation of the "Service de la Voirie" of Paris. In view of this new organisation, M. Legros has been appointed inspecting architect-in-chief, and M. Pierron his assistant. —The museum of ceramic work at Sèvres has received the addition of an example of terra-cotta of the Renaissance epoch, found at Poitou. —As M. Mercier's statue of Jeanne d'Arc for Domrémy cannot be finished till 1897, it is proposed to carry out the ceremony of inauguration with the plaster model which was exhibited at the Salon. —A new post and telegraph establishment has been opened at St. Nazaire. —The Art Society of Aix, in Provence, will open an art exhibition shortly. —The death is announced, at Mantes, of the sculptor Pierre Edouard Charrier, whose son, M. Henri Charrier, is known as a talented painter.

MISCELLANEOUS.

THE ARCHITECTURAL ASSOCIATION CURRICULUM AND THE INSTITUTE EXAMINATIONS. —A deputation from the Architectural Association—consisting of the President, Mr. W. D. Caroe, ex-President, Mr. E. W. Mounford; the Hon. Secretary, Mr. Banister F. Fletcher and Mr. F. R. Farrow—was received on the 17th inst. by the Board of Examiners, of the Institute of Architects. The deputation stated the views of the Association Committee respecting the periods at which the Examinations are now held, and described the Spring Examinations, usually held in March, as especially inconvenient to members going through the Curriculum of the Association. A suggestion that the Preliminary, Intermediate, and Final Examinations might in future take place at the end of June and commencement of July was thereupon made, and after due consideration was thought a convenient period for members of the Association, some of whom at that time would have come to the end of their respective educational courses, and would be prepared to apply for admission to the Examination of the Institute. No desire was expressed on the part of the deputation to alter the period at which the Autumn Examinations are now held. The Board, having acquiesced in these views, recommended the Council to adopt them, adding that it was most desirable to meet the wishes of the Architectural Association in this matter. The result is that, during the coming session, the Examinations will be held in November-December, 1895, and June-July, 1896—the exact dates for which will be published next month. Revised circulars and application-forms embodying the several modifications are now in the printers' hands. —*Journal of the Institute.*

BUILDING REGULATIONS IN STOCKHOLM.—It may be of interest to quote the following building regulations in force in Stockholm:—1. First-class houses must be constructed of either stone or brick; 2. The stairs of all such houses must be either of stone or iron, and fixed in stone walls from cellar to attic, having at least a thickness of one foot; 3. Cellars must be constructed of massive stone arches, founded in mortar or cement, and must support the ground or basement floor. This floor should be constructed of iron beams, and the spaces between filled with broken brick, gravel, mortar, or clay, rendering it fireproof; 4. The attic must be constructed of fireproof masonry filled in between the beams of the upper surface, constructed of bricks, or tiles sunk in mortar or cement, forming a continuous solid floor over the beams; 5. Iron doors sunk in stone doorways shall be fixed for the closing of attic as well as cellar, and these doors locked at night to arrest draught in case of fire; 6. Where elevators are permitted, the shaft must be constructed of solid masonry, and an door opening upon the shaft must be of iron, and close automatically; 7. Roofs must be covered with tiles, slates, or sheets of metal; 8. The external walls of the house must be fireproof, and at least a foot in thickness; 9. The height of a building should, in general, not exceed the width of the street, and in no case exceed 68 ft.; 10. Only two-thirds of a plot of land must be built upon, leaving one-third for open spaces, but in the case of corner-plots the houses may cover three-fourths of the area; 11. All flues and chimneys must be of ample size; 12. They must be regularly swept and regularly inspected officially.

THE "LIGHTNING" BOLT.—The "Future" Bolt Syndicate send us a specimen of this bolt, which does not exactly merit its special title, as it would

take longer to close than an ordinary barrel-bolt; but as an inside bolt for a front door, which is what it is specially intended for, it is most efficient and very scientifically constructed, and affords absolute security except from actual breakage.

"WALKS IN BELGIUM."—A new edition of this useful little handbook for tourists, published at 30, Fleet-street, has been issued. A series of maps has been added to the new issue.

THE COMMISSIONERS OF SEWERS.—At the meeting of the City Commission of Sewers, on Tuesday last, attempts were made to reverse the decision arrived at, at the previous meeting, by which the principle was condemned of continuous working throughout the twenty-four hours while carrying out necessary street repairs in the chief thoroughfares of the City. The resolutions to rescind were lost by majorities nearly as large as those by which the principle of continuous working had been previously condemned; but in the course of the discussion a middle course was suggested, which met with more ready acceptance. The Engineer was asked to consider and report upon the practicability of carrying on street repairs in two shifts of eight hours each, from four or five a.m. to eight or nine p.m., this method of working to be applied to all leading thoroughfares if it could be carried out at a reasonable cost. A discussion then followed as to the lighting of streets of secondary importance, whether it should be by some form of electric-light or by incandescent gas-burners. On behalf of the latter method, an estimate had been sent in by a firm, stating, on the basis of experiments extending over a long period in Paris, that a reduction of 50 per cent. upon the ordinary gas-lamps could be effected, and that the cost of lighting by incandescent gas-burners could be carried out at one-eighth the cost of electric lighting for equal candle-power. The unsatisfactory results given by experiments made in Aldermanbury and Basinghall-street, with various forms of electric lighting, led to the instruction of Mr. Preece and the City's electrical inspector, Mr. Voysey, to formulate a scheme which it is now proposed to try experimentally in order to establish data for estimates, in Bow-lane, Watling-street, and other minor streets on three different principles of electric lighting, and it was at Tuesday's meeting resolved to add, as a fourth method, the proposed incandescent gas system in two other contiguous streets.

THE CARPENTERS' COMPANY.—The annual examination for "shop and outdoor foremen," &c., was held at Carpenters' Hall on June 19-22. The examiners were Mr. F. C. Penrose, Professor Banister Fletcher, and Professor T. Roger Smith. The following is a list of the successful candidates arranged in order of merit:—First Class: H. C. Grubb (silver medal); W. H. Masters and S. A. Switzer (bronze medals); W. H. Betambean; Jas. Williamson. Second Class: W. J. Bailey; H. G. Owen; J. S. Knight; W. S. Sharpin; G. S. Woods; G. F. Hicks; Jas. Cluff.

THE PHOTOGRAPHIC SALON.—The third annual exhibition of the Photographic Salon will open at the Dudley Gallery on Monday, September 30, to remain open till November 2.

WEST-COUNTRY SCULPTURE WORK FOR INDIA.—Mr. Frederick W. Stevens, F.R.I.B.A., of Bombay, has just visited the studios of Messrs. Harry Hems & Sons for the purpose of inspecting the sculpture now in hand there for the new premises of the Standard Life Assurance Company, at present erecting from Mr. Stevens's designs in Dalhousie-square, Calcutta. The work that Messrs. Hems are engaged upon is, in the main, the colossal sculpture in stone for the main facade. The principal feature of this is a large pediment, 30 ft. long and 7 ft. high. Therein, grouped in various attitudes, are seen the Ten Virgins, all carved in the round, and each individual figure over 6 ft. high. The central group are the five wise virgins. In contrast to these happy maidens are the other virgins on either side. Another statue, yet in the clay, represents Atlas bearing upon his bent shoulders the Globe. Two other large statues are entitled respectively "Life" and "Death."

STATUE TO CROMWELL.—Following the recent discussion in the House of Commons on the proposed statue to Cromwell, the *Daily Chronicle* expressed its willingness to receive subscriptions for the purpose of erecting the statue, with the result that the money has already been promised. Arrangements for the erection of the statue are in progress, and a commission has already been given to Mr. Thornycroft, who will at once proceed with the design.

THE INTERNATIONAL RAILWAY CONGRESS.—The fifth session of this Congress, which originated in Belgium in 1885 (the date of the National Jubilee), and has been continued by sessions held in Milan (1887), Paris (1889), and St. Petersburg (1892), was formally opened, in the presence of about 1,000 delegates from all the leading railway administrations in the world, by the Prince of Wales on Wednesday last, at the Imperial Institute. M. Dubois, President of the Permanent Committee (Director of the Chemin de Fer de l'Etat Belge), and Mr. Bryce, M.P. (representing the Board of Trade), subsequently addressed the assembly, the latter quoting some remarkable statistics to show the wonderful expansion of the railway interests of the United Kingdom during the last thirty years. The capital invested in them now amounted to 1,000,000,000 sterling, or one-sixth of that of the whole of the

railways in the world. Last year 900,000,000 passengers were here carried, without counting season-ticket holders, who numbered 1,574,000; while in the same period 325,000,000 of tons of merchandise had been carried over the British railways. Not only land traffic, but water carriage, had developed enormously throughout the world in the railway period which began but a little over half a century ago. Already railways had broken down caste in India, and they were making the world of to-day practically smaller than the little world known to our ancestors twenty centuries ago, while their influence in the future on the welfare of mankind was absolutely incalculable. —Lord Stalbridge (London and North-Western Railway) was elected President, and Sir Henry Oakley, Secretary of the Congress, and afterwards the various sections proceeded to the election of their own Presidents and principal officers. In the evening a reception was held at the Foreign Office, when many hundreds of the delegates were presented to Mr. Bryce, the outgoing President of the Board of Trade. Until Monday morning, when the work of the sections will commence, the foreign delegates will spend the interval in visits to Crewe, Manchester, Liverpool, Darlington, Derby, Swindon, Cardiff, and other railway centres, for which free excursions have been organised.

SURREY ARCHAEOLOGICAL SOCIETY.—An excursion of this Society was recently made to Darenth, in Kent, to inspect the recently-discovered Roman Villa there. The members were received by Mr. George Payne, F.S.A., Hon. Secretary of the Kent Archaeological Society. As we devoted an article to Darenth recently, on the occasion of a visit of the Kent Archaeological Society, it is unnecessary to return to the subject further at present.

CARDIFF EXHIBITION.—A meeting of the building committee of the Cardiff Exhibition was held at the Cardiff Town Hall on the 28th inst., under the presidency of Mr. Lascelle Carr. An application was received from Mr. J. T. Crayber, Canton, to be installed as clerk of the works of the Exhibition buildings. Mr. Seward said he did not see that a clerk of the works was required, and the matter was thereupon deferred for later consideration. A letter was then read from Mr. J. A. Sant, Hon. Secretary of the Fine Art Section, asking for further space for art exhibits. A discussion arose as to the patronage this department was likely to receive at the hands of the public. Mr. W. S. Ordern thought that as much room should be given this form of exhibit as possible. In Bristol, he said, it was the art show which was chiefly accountable for the success of their exhibition. People would come to see pictures if they did not come to see anything else. The other members of the committee expressed a different opinion, and it was resolved that the space allotted to the art exhibition could not at present be extended. Mr. T. H. Riches suggested that all those portions of the Exhibition for which steam would need to be used should be arranged close together or in one neighbourhood. He alluded to the machinery, mining, maritime, and agricultural departments, for all of which steam would be required. If those sections which he had enumerated were placed in proximity one with another they would have steam all over the building, and this would spoil the whole Exhibition. A new design for the Exhibition entrance was presented by Mr. Seward, the plan showing a structure of Oriental design with five domes.

LEGAL.

ACTION IN CHANCERY DIVISION FOR OBSTRUCTION TO ACCESS OF LIGHT TO TWO HOUSES AT EXETER.

THE case of *Harding v. The Exeter Corporation* came before Mr. Justice Romer in the Chancery Division last week, it being an action brought by the plaintiff, a draper at Honiton, against the Mayor, Aldermen, and citizens of the city and county of Exeter, for a mandatory injunction and damages in respect of an alleged obstruction to the access of light to two houses belonging to him in Bradwinch-place, Exeter. It was alleged that the obstruction was caused by the defendants building on some vacant ground an extension of the Queen-street Museum.

His Lordship, after hearing a mass of evidence of the usual contradictory character, in giving judgment, said that although the statements as to the damage done to the plaintiff's houses was somewhat exaggerated, he was of opinion that the plaintiff's light had been interfered with to a substantial extent. The access of light to the windows had been interfered with to such an extent as to render the houses substantially less comfortable and enjoyable, and less convenient for the purposes of occupation than they were before the erection of the defendants' new buildings. There was no doubt that the plaintiff's expert witnesses had greatly over-estimated the amount of damage done; but, on the other hand, the defendants' witnesses were wrong in saying that there was no damage whatever. Taking everything into consideration he should assess the damages at the sum of 1000, and order the defendants to pay the plaintiff's costs of the action, except so far as they had been increased by the plaintiff claiming a mandatory injunction. Such increase in the defendants' costs by the claim to be paid by the

u.t. 72 yrs, g.r. 39^l. 105, r. 545^l. 125, 3,500^l; 8 to 24 (even). Venust-st., u.t. 72 yrs, g.r. 271^l, r. 262^l. 125, 1,800^l; 85, 87, 89, 91, and 91A, Teviot-st., u.t. 72 yrs, g.r. 231^l, r. 137^l. 125, 830^l; 1 to 35, Uamvar-st., u.t. 72 yrs, g.r. 631^l, r. 468^l, 3,205^l; 80 to 88 even, Spey-st., u.t. 75 yrs, g.r. 101^l, r. 117^l, 805^l; 2 to 16 even, Ailsa-st., u.t. 79 yrs, g.r. 121^l. 125, r. 187^l, 45, 1,290^l.

rock: 39, *Pastel-st.*, *Wandsworth* and a *g.r.* of 346. 85, u.t. 133 yrs., *g.r.* 101, 1001; i.g.r. of 684. *ros.*, *Pascal-st.*, u.t. 124 yrs., *g.r.* 387. *ros.*, 1001; 15 to 35 odd, *Pascal-st.* u.t. 132 yrs., *g.r.* 201, 2351.—By *Baxter*, *Payne*, & *Lepper*: 85, 87, and 89, *The Broadway*, *Bexley Heath*, f. *r.* 1161, 2,5601; 60, *West Chislehurst Pk.*, *Eltham*, u.t. 00

yrs., g.r. 131., 651., 500.—By *Foster & Cranfield*: 161. and 163, Peckham Pk.-rd., Peckham, f., r. 721., 1,250.; 15A, 16, 17, 18, and 45, Radnor-street, and stabling premises, u.t. 45 yrs., g.r. 161. 138., 950.—By *Frank Jolly & Co.*: 2, Cricketsfield-road, Clapton, f., r. 331., 460.; 57, Downland, f. r. 1001., 1,401.; 80, Malmesbury, Peck-

u. t. 5 1/2 yrs., g. r. 4 1/2, r. 28 1/2, 270 1/2.—By *Hobson, Richards, & Co.*: "The Hawthornes," Oakleigh Pk., and 2 r. 25 p., f. 1, 435 1/2; "Oakwood," Richmond-rd., Barnett, f. r. 100 1/2.

1,950l.—By *Mark Lill & Son*: 40, 40, 50, and 52,
Disraeli-rd., Forest Gate, f., r. 120l., 1,650l.: 41, 43, 46,
and 48, Olinda-rd., Stamford Hill, u.t. 84 yrs., g.r. 20l.,
620l.—By *J. Hibbard & Sons*: 34, Matthias-rd., Stoke
Newington, u.t. 62 yrs., g.r. 87 8—

(Contractions used in these Lists.—F.g.r. for freehold ground-rent; L.g.r. for leasehold ground-rent; i.g.r. for

t. for treenoid; c. for copynoid; l. for leasnoid; e.r. for
estimated rental; u.t. for unexpired term; p.a. for per
annum; yrs. for years; st. for street; rd. for road; sq. for
square; pl. for place; ter. for terrace; cres. for crescent;
yd. for yard, &c.]

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square; pl. for place; ter. for terrace; cres. for crescent;
yd. for yard, &c.]

PRICES CURRENT OF MATERIALS.			
TIMBER.		TIMBER (continued).	
Greenheart, B.G.	ton	8/0/0	0/0/0
Teak, E.I., load	10/0/0	16/0/0	
Sequela, U.S. ft. cu	3/10	9/8	
Satin, Porto Rico	0/0/6	0/1/6	
Walnut, Italian....	0/0/34	0/0/7	

Ash, Canada loc.	2/15/0	4/10/0
Birch, do.	2/15/0	4/10/0
Camp, do.	2/15/0	4/10/0
Fir, Dancsic, &c.	2/15/0	4/10/0
Oak, do.	2/15/0	4/10/0
Pine, Canada red	2/15/0	4/10/0
Do, Yellow	2/15/0	4/10/0
Larch, Dancsic, &c.	2/15/0	4/10/0
Wanscott, Riga	2/15/0	4/10/0
Spruce, loc.	2/15/0	4/10/0
Deals, Finland	2/15/0	4/10/0
And 8-1st rd roo	7/10/0	8/10/0
Do, 2nd & 3rd .	8/10/0	9/10/0
Do, Riga	8/10/0	9/10/0
Do, 1st & 2nd	8/10/0	9/10/0

St. Petersburg,					
1st yellow	9/10/0	10/10/0			
2nd " " " " "	7/10/0	8/10/0			
Do, white	8/10/0	9/10/0			
Swedish	7/10/0	15/10/0			
Do, Wm	10/10/0	15/10/0			
Canada, Pine 1st	22/10/0	24/10/0			
Do, 2d	25/10/0	27/10/0			
Do, do, grd. &c.	8/10/0	10/10/0			
Do, do, grd. &c.	10/10/0	10/10/0			
Do, do, grd. &c.	10/10/0	10/10/0			
Do, do, grd. &c.	6/10/0	7/10/0			
Do, do, grd. &c.	6/10/0	7/10/0			
Battens, all kinds	5/10/0	5/10/0			
Flooring boards					
2d, prep.					
2d, prep.	0/6/6	0/7/4/6			
Do, and	0/6/6	0/13/0			
Other qualities -	0/4/6	0/7/1/0			
Do, and					
English com.					
brands	20/10/0	10/15/0			
6 lbs. per bag					
and upwards ..	37/10/0	0/6/0/0			
Z 1st C - English	12/10/0	0/6/0/0			
sheet	10/10/0	0/6/0/0			
Vieille Mon.					
TIN - Silesia	12/10/0				
Australian	6/15/0	6/31/0			
English Ingot.	6/31/0	6/31/0			
Billicot	6/31/0	6/31/0			
Billicot	6/31/0	6/31/0			
OILS.					
Linosed	21/7/0	21/7/0			
Liquat. Cast.	21/7/0	21/7/0			

Honduras, c.	3	1/4	Do. Ceylon	22/10/0	22/15/0
Mahogany, Cuba	3 1/2	7/6	Palm, Lagos	22/10/0	0/0/0
Do. Domingo, cargó av.	3 1/2	1/0	Rapeseed, English pale	23/0/0	0/0/0
Mexican do. do.	3	1/4	Do. brown	21/5/0	21/10/0
Tobacco do. do.	3 1/2	7/6	Cottonseed ref. .	18/0/0	18/15/0
Honduras do.	3 1/2	1/0	Oleum	20/10/0	21/10/0

Ros. Turkey ton	4/10	25/00	Lubricating, U.S.	5/10	8/60
Ros. Rio	10/10	16/00	Do. black	5/10	8/60
Satin	4/10	16/00	74-55	5/10	8/60
Satin, St. Do-			barrel	5/10	8/60
mingo	4/10	5/10	Archeangel	6/15	9/00

W. Bowers.....	2,984 15	H. Smith, Kilmarnock ster (accepted).....	1,885 0
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ABERSYCHAN.—For the construction of a sewer (330 yards), High-street, Garndiffaith, for the Urban District Council, Mr. E. Cooke, surveyor, High-street, Abersychan:—

W & A Davies	s. d.	Wm. Pardoe, Pontypool	s. d.
William Gregory	5 9	(accepted)	3 9
P. J. L. Epps	5 6	Thos. Price	1 0
	4 3		

ABERYSTWYTH.—For the completion of lecture-room, &c., University College of Wales. Mr. T. E. Morgan, architect, 12, Baker-street, Aberystwyth.—

John Williams £50 10
Thomas Hopkins £405 0
[All of Aberystwyth.]

ASHTEAD - Accepted for sundry decoration, for Mr. Jones -
Jarvis, Surbiton £133

BLAENGYWYMPI (Wales). For the erection of twenty-five
workmen's houses, for the Aberystwyth No. 1 Building Club Messrs.
Griffiths & Jones, architects, Tonypany and Pontypridd -
D. C. Jones & Co., Tonypany accepted £6,750
Rowlands & Lloyd, Tonypany accepted £1,275
[Several other tenders received.]

TIMBER.		TIMBER (continued).	
Greenheart, B.G.		Satin, Porto Rico	0/0/6 0/1/6
ton	8/0/0 0/0/0	Walnut, Italian....	0/0/3 0/0/7
Teak, E.I., load	10/0/0 16/0/0		
Sequoia, U.S. ft. cu	1/10 2/2		

METALS.			
Ask, Canada 1st	21/50	41/50	
Elm, do.	21/50	41/50	
Fir, Danstic, do.	21/50	41/50	
Elm, do.	21/50	41/50	
Do, Yellow	21/50	41/50	
Lash, Danstic, 1st	21/50	41/50	
St. Peter, do.	21/50	41/50	
Wanscott, Riga,	21/50	41/50	
Ask, 1st	21/50	41/50	
Do, 2nd	21/50	41/50	
Do, 3rd	21/50	41/50	
Do, 4th & 5th	21/50	41/50	
Do, 6th	21/50	41/50	
Do, 7th	21/50	41/50	
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[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays.*]

ABERGAVERNNEY.—For the	erection of residence, Stanhope
Park Estate, Abergavenny, for	Mr. C. O. Cotton. Mr. E. A.
Johnson, architect, Abergavenny.	Quantities by architect:—
J. D. Williams	2,200 0
Hatherley & Carr	2,097 0
J. Linton	2,950 0
W. Bowers	2,984 25
	H. Parfitt
	1,965 0
	I. G. Thomas
	1,960 0
	H. Smith, Kidderminster
	ster (accepted)
	1,885 0

ABERSYCHAN.—For the construction of a sewer (335 yards), High-street, Garndiffaith, for the Urban District Council. Mr. E. Cooke, surveyor, High-street, Abersychan :—

W & A Davies	5	9	Wm. Pardoe, Pontypool	
William Gregory	5	6	(accepted)	3
P. J. L. Epps	4	3	Thos. Price	1

ABERYSTWYTH.—For the completion of lecture-room, &c.,
University College of Wales. Mr. T. E. Morgan, architect, 12,
Baker-street, Aberystwyth.—
John Williams £500 10 | Owen Bros. (accepted) .. £405 0
Thomas Hopkins..... 460 0
[All of Aberystwyth.]

ASHTED—Accepted for sundry decoration, for Mr. Jones :—
Jarvis, Surbiton £133

BLAENGWYNFI (Wales). For the erection of twenty-five workmen's houses, for the Abergwafi No. 1 Building Club Messrs. Griffiths & Jones, architects, Tonypandy and Pontypridd —
D. C. Jones & Co. £6,250
Rowlands & Lloyd, Tonypandy (accepted) 4,125
[Several other tenders received.]

BOSHAM (Sussex)—For the erection of school buildings, &c., for the School Board. Mr. N. C. H. Nisbett, architect, 52, High-street, Winchester. Quantities supplied.

Cook	2,507	10	Budden, Winchester	2,386	0
Longley & Co.	2,535	0	Peters	2,198	0
Jackson & Co.	2,428	0			

* Accepted subject to modification.

BRIDGLINGTON QUAY (Yorks).—For the extension of caliche-
tine drail-hall, for Mr. G. Wootley, Mr. J. Earnshaw, architect,
W. H. B. Street, Bridlington Quay accepted..... £48
J. Sawdon 794
J. Renard, Bridlington Quay accepted..... 185

BRISTOL.—For proposed new schools and class-rooms and altera-
tion of the Barton T. St. Newport, Bristol, by Mr. C. F. Street
Tottenham, Bristol, for the Trustees Mr. Wm. Paul, architect,
Wells-road, Bristol, quantities by the architect

	School	Church	Whole.
A. J. Bevan	1,000	£670	£1,670
J. Harford	968 17	1,148	2,116
C. W. Hayn	1,224	975	2,199
C. W. Hayn	1,224	975	2,199
M. Dumford	2,060	945	£2,995

* Accepted by the Trustees.

CHELMSFORD. For additions, &c., to gran street school, Chil-
dren's for the Director, Mr. F. Whitmore, architect, 2, E. E.
street, Chelmsford.—

Henry Potter	£199 10	J. A. Moss & Co.	£109 15
Henry Kennell	110 0	J. As. Norrington ..	175 0
Lummis & Son	111 0	J. Broomehead	68 17

Accepted..... 100

(CHILWELL) Notts.—For erection of a school at Chilwell, for
the School Board, Mr. Fredk. Ball, architect, 5, Huntsgate,
Nottingham

H. Bell	£1,318 11	Perks & Son	£474 6
Gibbert & Gibbitts	1,525 0	J. Overton	1,369 1
J. Hall	1,400 0	Gill & Sons	1,335 0
Wm. Maule	1,425 0	J. Cutbush, Notting.	1,335 0
J. Cooper	1,440 0	Has. Hatting	1,335 0
H. Vickers	1,440 0	Has. Hatting	1,335 0
G. Youngman	1,440 0	Has. Hatting	1,335 0

CWMILLERY (Mon.)—For additions to school buildings,
Nauygo and Cwmillery, for the Aberystwyth School Board, Messrs.
Glynne & Cantwilly, architects, Victoria Buildings, Abercrombie. Quantities
by Mr. R. L. Roberts.—

A. P. Williams	£508	Davies Bros.	£67
Geen Bros.	531	A. Richards, Newbridge	49
J. Jenkins	531	Mont'g	49

Nauygo

J. F. Morgan	£625	Jenkins, Brynmawr, Breck	£195
J. Jenkins	330	J. Jenkins, Brynmawr, Breck	330
A. Richmond	330	Knockins	330

* Accepted.

DARTINGTON.—For erecting a farmhouse at Head, from
designs supplied by the proposer, Messrs. Chapman-Pemberton.
Quantities by Mr. Vincent Caterham Brown, Paignton, Devon.

H. Mills	£685	Westlake, Paignton ..	£693
H. F. Salsbery	685	Westlake & Blight ..	685

* Accepted.

DORKING.—For making up Watlen-road, for the Dorking
Urban District Council, Messrs. G. Somers Matthews, Surveyor—

E. Beer	£199 17	E. Beer & Son	£295 0
G. A. Franks	245 0	W. H. Wheeler, Lon.	245 0
W. M. Woodhouse	275 0	Don accepted	209 0

DURHAM.—Accepted for two class-room, Blue Coat Schools,
Durham, for the Trustees. Mr. H. Henry, architect, Durham,
— Walton, Durham..... £473 10 6

DURHAM.—Accepted for erecting eight dwelling-houses,
for the Durham Co-operative Society, Limited, Mr. H. Henry, archi-
tect, Durham.—

Maitney — J. G. Bradley	£283 0 0
Staring — W. Watson	379 15 0
Staring — W. Blakey	379 15 0
Staring — J. Neale	18 0 0
Staring — J. Neale	18 0 0
Painting and Glazing — J. H. Dodd	48 10 10

[All of Durham]

EXETER.—For the erection of a new for seventy-five
beds at the Devon and Exeter Hospital, exclusive of heating,
plumbing, &c., Mr. Charles Cole, architect, 50, High-street,
Exeter

I. R. Gibbard	£58	A. B. ...	£288 0 c
Laphorne & Co.	58	A. B. ...	288 0 c
A. B. Tolson	297	A. B. ...	742 0
J. Setter Bros.	295	A. B. ...	742 0
F. A. Johnson	315	A. B. ...	742 0
E. Pratt	315	A. B. ...	742 0
W. Gibson	315	A. B. ...	742 0
Ham & Pamour	315	A. B. ...	742 0
G. Herben	315	A. B. ...	742 0
T. Tree & Bailey, Exeter ..	315	A. B. ...	742 0

* By resolution accepted.

A. extra price for building building in cement.
B. extra price for completing the work in twelve months.

FERNDALE (Wales).—For the erection of nineteen houses
Blanchfield, Mr. T. R. Phillips, architect, Old Bank Chambers,
Plymouth road —

J. L. Prothero, Ferndale, Glam.	£3 47
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GREAT YARMOUTH.—For alterations to 28, South Quay,
Great Yarmouth, for the Great Yarmouth School Board, Messrs.
Buttle & Gilbey, architects, Great Yarmouth —

A. E. Rend	£185	J. T. Howes	£159 0
W. Leeco	179	J. Has. Hannan ..	155 0

Carpenter.

Moore & Wright	£140	J. J. Ball	£110 10
J. P. Newb	140	Latier & Wright ..	110 10

Plumber and Painter, &c.

Harrod	£36	J. J. Coffin	£39 10
J. E. Mason	36	J. J. Coffin	39 10

[All of Great Yarmouth]
* Accepted.

HALIFAX.—Accepted for the erection of retaining-wall, Hipper-
burne, Messrs. Jackson & Fox, architects, 22, George-street,
Halifax:

Thomas Pickles, Ludlenden colliery ..	£36
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HASTINGS.—For the construction of sewer, Silverhill, for the
Hastings District Council, Messrs. Jeffery & Skiller, surveyors, 11,
Ruffe & Stanham £10 19 11 | J. Piper | £68 5 || A. Kinc | 19 11 | Wm. Piper, Hastings | 68 5 |
| G. Mell | 19 11 | Wm. Piper, Hastings | 68 5 |

* Accepted.

HINDREWELL.—Accepted for new tracery windows and new
floors and other works, to Hindrewell Church, Yorkshire, Messrs.
R. Atkinson & Son, architects, 10, York-street, Leeds —

K. Hanland	£241 14
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LILIPDS.—Accepted for the erection of shops, Brigiate and
Aston, Messrs. W. L. Smithson, architect, 46, Albion-street,
Leeds. Quantities by the architect —

George Scalfie,	£1 95
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Atkinson Bros., 31, Ann-street, Leeds.

LILYPHYLLIA (Wales).—For the erection of two shops for
Messrs. Phillips and Williams. Messrs. Griffiths & Jones, archi-
tects, 10, Market-street, Cardiff. Messrs. Tonyandy and Pontypridd
John Rees, surveyors, 10, Market-street, Cardiff. Messrs. Lloyd, Teny-
Pavey Bros. 680 * Party accepted..... £630

LONDON.—For repairs, cleaning, painting, &c., at the Cleveland
Street Sick Asylum, for the Managers of the General Dispensary,
Cleveland District, Mr. W. S. Cross, architect, 10, Outer Temple —

Franklin & Co.	£1,645	Marchant & Hurst ..	954
Oxley Bros.	1,645	Marchant & Hurst ..	954
Wason	1,645	Marchant & Hurst ..	954
T. F. Mitchell	1,645	Marchant & Hurst ..	954
James & Co.	1,645	Vankings	890
Neal	1,645	Vankings	890

* Accepted.

LONDON.—For alterations and additions to "The Chatsworth
Arms," Lower Chapel, for Mr. G. C. Poole, Mr. Geo. Stevens,
architect, 101, Glynn-road, Homerton, N.E. —

P. Parsons	£1
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GRAY'S (Essex)—For the supply of granite kerling and setts, for the Urban District Council, Mr. A. C. Janes, Surveyor, High Street, Gray's.

Setts	Price per Ton.	Keeling	Price per Yard.
Description		Description	Straight Curved.
A. L. Branton & Sons, North Queensberry	2 8 0	North Queensberry	4 0 0
W. Heskin & Co.	1 5 0	Penryn	4 0 0
J. Sheehan	1 5 0	Penryn	4 0 0
E. J. Barrett	1 5 0	Penryn	4 0 0
Elcheid & Co.	1 5 0	Penryn	4 0 0
S. Frickes & Sons	1 5 0	Penryn	4 0 0
N. Griffiths	1 5 0	Penryn	4 0 0
J. Gordon & Sons	1 5 0	Penryn	4 0 0
E. J. Van Praagh & Co.	1 5 0	Penryn	4 0 0
G. J. Mowatt & Co.	1 5 0	Penryn	4 0 0
Novell & Rouson	1 5 0	Penryn	4 0 0
Enders & Stoney Station Granite Co.	1 5 0	Penryn	4 0 0
Croft Granite Co.	1 5 0	Penryn	4 0 0
W. Grimley	1 5 0	Penryn	4 0 0
A. & P. Munnell	1 5 0	Penryn	4 0 0

* Accepted.

LONDON.—For making up and paving roads in the Parish of Fulham, for the Fulham Vestry, Mr. Charles Batterell, Engineer and Surveyor.

Setts	Price per Ton.	Keeling	Price per Yard.
Description		Description	Straight Curved.
Imperial Stone Co.	2 8 0	North Queensberry	4 0 0
Victoria Stone Co.	1 5 0	Penryn	4 0 0
Imperial Asphalt Co.	1 5 0	Penryn	4 0 0
W. Griffiths	1 5 0	Penryn	4 0 0
Novell & Rouson	1 5 0	Penryn	4 0 0
H. J. Greenham	1 5 0	Penryn	4 0 0
M. Meers	1 5 0	Penryn	4 0 0
G. Wimpsey & Co.	1 5 0	Penryn	4 0 0

LONDON.—Accepted for alterations to "The Crown Tavern," 4th, Mare-street, Hackney, Mr. K. A. Lewcock, architect, 88, Bishopsgate-street Within, E.C.4.

LONDON.—Accepted for alterations to "The Iron Bridge Tavern," East India Dock-road, Mr. R. A. Lewcock, architect, 88, Bishopsgate-street Within, E.C.4.

LONDON.—Accepted for alterations to "The White Hart Tavern," High-street, Stoke Newington, Mr. R. A. Lewcock, architect, 88, Bishopsgate-street Within, E.C.4.

LONDON.—Accepted for alterations to "The Old King's Head," Toley-street, Mr. R. A. Lewcock, 88, Bishopsgate-street Within, E.C.4.

LONDON.—Accepted for alterations (first contract for structure) to "The Unicorn Tavern," High-street, Shoreditch, Mr. R. A. Lewcock, architect, 88, Bishopsgate-street Within, E.C.4.

LONDON.—Accepted for alterations to "The Britannia Tavern," 133, Wandsworth-road, Mr. R. A. Lewcock, architect, 88, Bishopsgate-street Within, E.C.4.

LONDON.—For the extension of shop and erection of Warehouse in rear of 141, Rye-lane, Peckham, S.E., for Mr. Wm. F. Humphis, Mr. J. R. Manning, architect, 141, Rye-lane, Peckham, S.E.

F. & H. F. Higgs.—Accepted for alterations to "The Birbeck Arms," Elthorne-road, Hornsey, E., for Mr. F. W. Chamberlain, Mr. R. Dickinson, architect, 5, John-street, Adelphi, W.C.2.

LONDON.—For making up and paving roads in the Parish of Fulham, for the Fulham Vestry, Mr. Charles Batterell, Engineer and Surveyor.

LONDON.—For the completion of four houses, Forest Hill, for Mr. A. Green, architect and surveyor, Tottenham.

LONDON.—For the construction of sewer from Bell-green to Penge, for the Lewisham Board of Works.

LONDON.—For alterations, &c., to "The Birbeck Arms," Elthorne-road, Hornsey, E., for Mr. F. W. Chamberlain, Mr. R. Dickinson, architect, 5, John-street, Adelphi, W.C.2.

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WESTRY.—Accepted for the erection of six houses and 1 stables, Chapel-street, Mr. F. H. Shaylor, architect, 33, Wadsworth-street, Cheltenham.

W. H. Thomas, Westbury.

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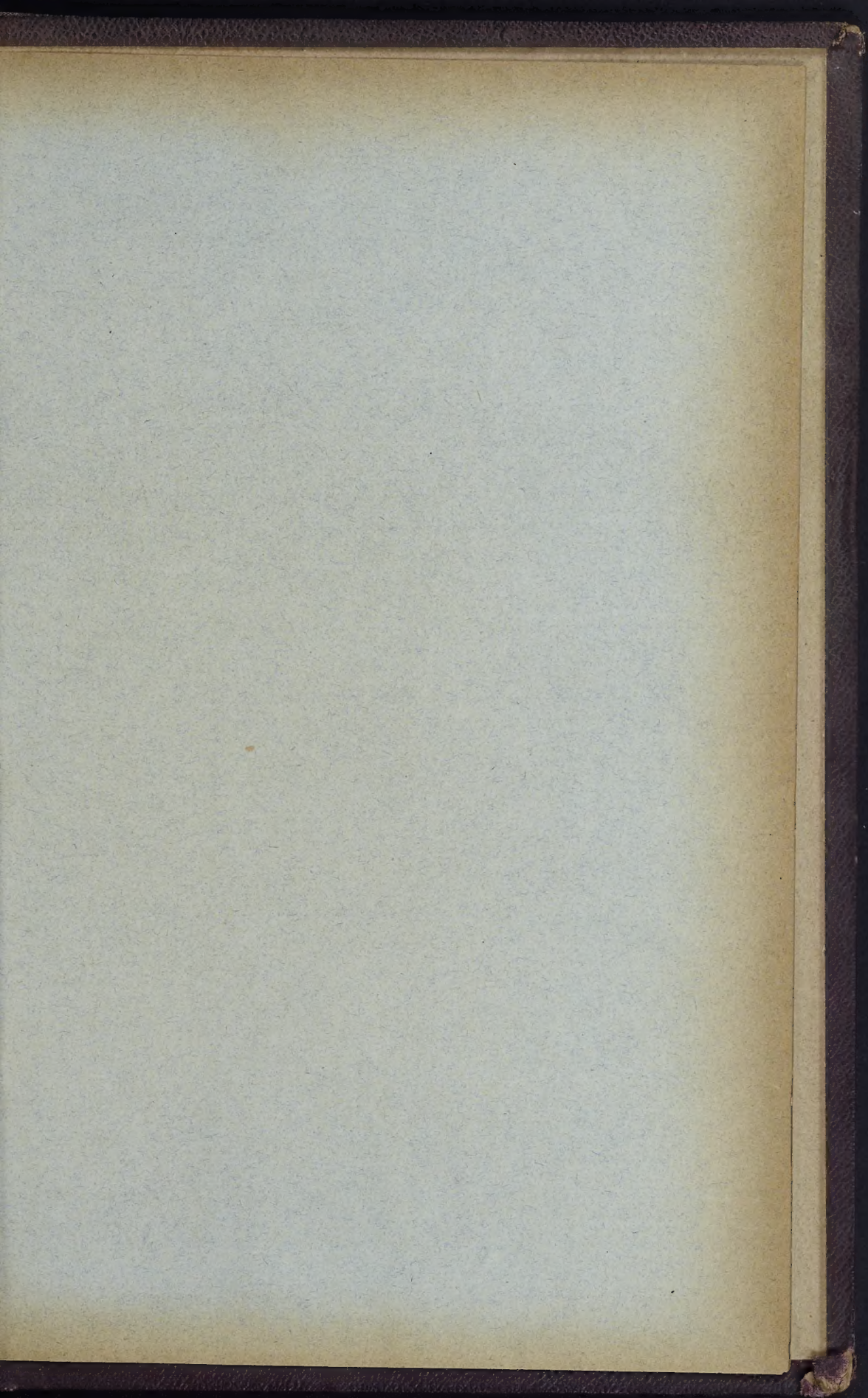
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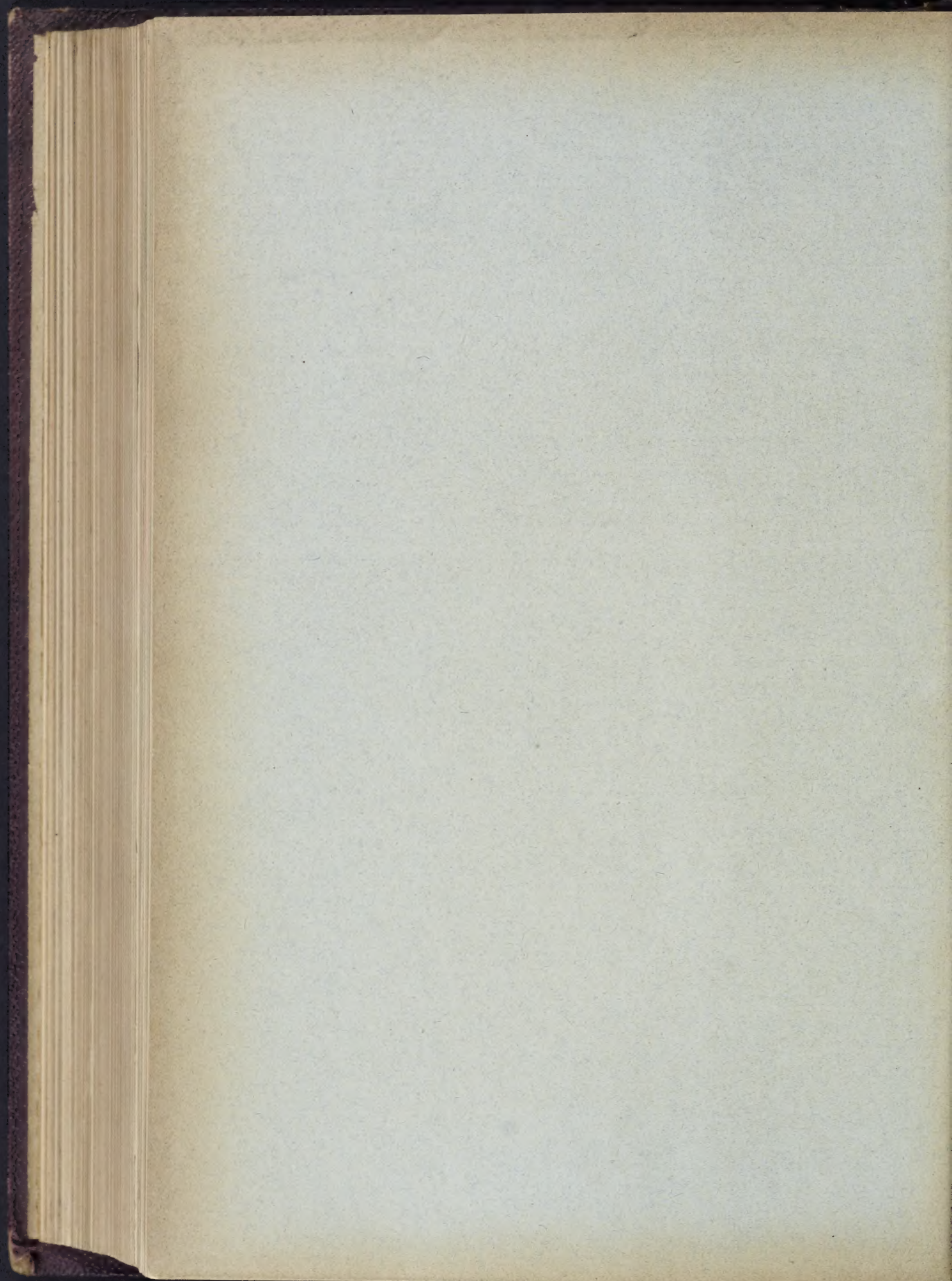
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